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ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-51A) LAUNCH

By D. L. Johnson, G. Jasper, C. K. Hill, and G. W. Batts
Systems Dynamics Laboratory

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16. ABSTRACT

This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-51A launch time on November 8, 1984, at Kennedy Space Center Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of pre-launch Jimsphere measured vertical wind profiles is given in this report. The final atmospheric tape, which consists of wind and thermodynamic parameters versus altitude, for STS-51A vehicle ascent has been constructed. The STS-51A ascent atmospheric data tape has been constructed by Marshall Space Flight Center's Atmospheric Sciences Division to provide an internally consistent data set for use in post flight performance assessments.

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I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle/STS-51A vehicle. This Space Shuttle vehicle was launched from Pad 39A at Kennedy Space Center (KSC), Florida, on a bearing of 91 deg east of north at 1215 UT (0715 EST) on November 8, 1984.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-51A, together with the sequence of prelaunch Jimsphere measured winds aloft profiles from L-22 hr through liftoff. The general atmospheric situation for the launch and flight area is described, and surface and upper level wind/thermodynamic observations near launch time are given. Since the ship Redstone was unavailable for STS-51A duty, the SRB descent/impact atmospheric data were not taken. However, one can use the STS-51A ascent data for SRB studies, as the best substitute.

Previous MSFC-related launch vehicle atmospheric environmental conditions have been published as Appendix A of individual MSFC Saturn Flight Evaluation Working Group reports [1]. Office memorandums have been issued for previous flights giving launch pad wind information. A report has also been published [2] which summarizes most launch atmospheric conditions observed for the past 155 MSFC/ABMA-related vehicle launches through SA-208 (Skylab 4). Reports summarizing ASTP, STS-1 through STS-41G launch conditions are presented in References 3 through 16, respectively. Table 1 gives the atmospheric L+0 launch conditions for all Space Shuttle missions.

II. SOURCES OF DATA

Atmospheric observational data used in this report were taken from synoptic maps made by the National Weather Service, plus all available surface observations and measurements from around the launch area. Upper air observations were taken from balloon-released instruments sent aloft from Cape Canaveral Air Force Station (CCAFS). High-altitude winds and thermodynamic data were measured by the Super-Loki rocketsondes launched from the CCAFS. Table 2 presents a listing of systems used to obtain the upper level wind profiles used in compiling the final ascent atmospheric data tape. Data cutoff altitudes are also given in Table 2.

III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME

The eastern half of the United States was dominated by high pressure during the launch of STS-51A. Surface winds were moderate and northerly. Figure 1 depicts the surface weather map 15 min prior to launch. The wind flow aloft was ruled by westerly winds over the KSC Florida area. Figure 2 shows the winds aloft

conditions 15 min prior to launch. Clouds were scattered over the KSC launch area around the launch of STS-51A. Total sky cover at liftoff was 5/10. Figure 3 exhibits the GOES-5 infrared picture taken at 1230 UT (15 min after lift off). Figure 4 presents an up-close visible shot of the Florida peninsula as recorded by GOES-5, taken also at 1230 UT.

IV. SURFACE OBSERVATIONS AT LAUNCH TIME

Surface observations at launch time for selected KSC locations are given in Table 3. Included are pad 39A, shuttle runway, and CCAFS balloon release station observations. Neither precipitation nor lightning was observed at launch time.

Table 4 presents Pad 39A wind data along with other standard hourly atmospheric measurements and sky observations for the 6-hr period prior to launch of STS-51A. Values for wind speed and direction are given for the 84 m (275 ft) FSS reference level and 18 m (60 ft) pad light pole level.

V. UPPER AIR MEASUREMENTS DURING LAUNCH

The FPS-16 Jimsphere (1230 UT), MSS Rawinsonde (1218 UT), Super-Loki Rocketsonde (1356 UT), and Super-Loki Robin (1315 UT) systems were used to measure the upper level wind and thermodynamic parameters for STS-51A launch. At altitudes above the rocket-measured data, the Global Reference Atmosphere (GRA) [17] parameters for November KSC conditions were used. A tabulation of the STS-51A final atmospheric data for ascent is presented in Table 5 which lists the wind and thermodynamic parameters versus altitude. A brief summary of parameters is given in the following paragraphs.

A. Wind Speed

At launch time, wind speeds were 23.0 ft/sec (13.6 kn) at 60 ft and increased to a maximum of 131 ft/sec (78 kn) flowing from 272 deg. This maximum occurred at an altitude of 33,100 ft (10,089 m). The winds decreased above this level as shown in Figure 5. The overall maximum measured speed was 251 ft/sec (88 kn) at 167,000 ft (50,902 m) altitude.

B. Wind Direction

At launch time, the 60-ft wind direction was from the north-northeast (024 deg) and shifted to an easterly component by 6400 ft (1951 m). Above this level the winds shifted through north and became west-northwesterly/westerly by 18,400 ft (5608 m). The winds kept this westerly component above this level until they became easterly at 77,000 ft (24,470 m) through 107,000 ft (32,614 m). Above 107,000 ft the winds shifted through south and established themselves with a westerly component by 115,000 ft (35,052 m) altitude. The winds kept this westerly component up through 215,000 ft (65,532 m), where above this level the winds displayed an oscillatory pattern.

C. Prelaunch/Launch Wind Profiles

Prelaunch/launch wind profiles presented in Figures 6 through 9 were measured by the Jimsphere FPS-16 system for the launch at 1215 UT, November 8, 1984. Data are shown in six measurement periods beginning at L-21.6 hr and extending through L+0. Appendix A contains the Jimsphere profiles measured during the countdown sequence associated with the aborted launch originally scheduled for 1323 UT, November 7, 1984.

The wind speed and direction profiles for the 22 hr period prior to and including L+0 are shown in Figures 6 and 7. The in-plane (head-tail wind) and out-of-plane (left-right crosswind) profiles are given on Figures 8 and 9. The wind speeds and associated component values did not differ significantly from the November means, however, extreme shears in the 30,000 ft to 50,000 ft altitude layer at critical mach numbers caused large exceedances in the calculated ascent loads. The magnitude and variability of the measured shears and the resulting unacceptable loads were responsible for the launch delay on November 7. The prelaunch atmospheric conditions are discussed in more detail in Section III.

D. Thermodynamic Data

The thermodynamic data taken at STS-51A launch time, consisting of atmospheric temperature, dew-point temperature, pressure, and density have been compiled as the STS-51A ascent atmospheric data and are presented in Table 5. The vertical structure of temperature and dew-point temperature for the STS-51A ascent are shown graphically versus altitude in Figure 10.

The atmospheric thermodynamic parameters of temperature, pressure, and density, measured during STS-51A launch below 100,000 ft were all within 4 percent of their respective PRA-63 [18] annual values. All these parameters stayed within 21 percent of their respective PRA-63 values, at all levels of measurement.

E. SRB Upper Air and Surface Measurements

As has been mentioned in the introduction, since there was no ship available, an SRB descent atmospheric data tape has not been constructed. The tabular values for the ascent atmospheric tape as presented in Table 5 should be used for SRB descent/impact studies since it is the closest measured data source.

TABLE 1. SELECTED ATMOSPHERIC OBSERVATIONS FOR THE FLIGHT TESTS OF THE SPACE SHUTTLE VEHICLES

Vehicle Data[h]				Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance
				Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Press.[c] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)	Alt. (ft)	Speed (ft/sec)	Dir. (deg)	
1	STS-1 Columbia	4/12/81	0700	10.234[d]	21	82	11.8 15.2	125 120	44,300	98	250	
2	STS-2 Columbia	11/12/81	1010	10.166	23	61	27.0 27.0	345 355	36,300	158	286	
3	STS-3 Columbia	3/22/82	1100	10.160	24	71	7.0[e] 8.0[e]	50[e] 145[e]	45,000	119	250	Wind directional change observed at Pad just prior to L+0. Onset of sea breeze.
4	STS-4 Columbia	6/27/82	1100[f]	10.200	29	70	5.8[g] 4.9[g]	133[g] 141[g]	47,900	37	329	
5	STS-5 Columbia	11/11/82	0719	10.227	22	68	22.0 35.0	90 90	40,600	146	336	
6	STS-6 Challenger	4/4/83	1330	10.183	23	55	12.7 16.4	63 55	46,100	155	277	
7	STS-7 Challenger	6/18/83	0733[f]	10.146	25	80	5.9[e] 10.3[e]	10[e] 350[e]	45,900	76	278	
8	STS-8 Challenger	8/30/83	0232[f]	10.111	24	97	8.8 14.0	269 268	45,100	30	349	17 min countdown delay due to adverse weather conditions. Thunderstorms in area.
9	STS-9 (SL-1) Columbia	11/28/83	1100	10.153	24	83	19.1 32.0	183 190	47,100	117	252	
10	STS-11 (41-B) Challenger	2/3/84	0800	10.173	17	75	0.0 NA	0 NA	38,200	143	288	
11	STS-13 (41-C) Challenger	4/6/84	0858	10.149	16	56	21.5 18.6	320 275	37,700	176	289	
12	STS-41D Discovery	8/30/84	0842[f]	10.172	26	81	3.0 3.6	106 39	40,300	44	270	
13	STS-41G Challenger	10/5/84	0703[f]	10.210	23	60	16.5 14.8	73 58	40,600	78	303	
14	STS-51A Discovery	11/8/84	0715	10.227	20	59	23.0 31.1	24 10	33,100	131	272	24 hr delay due to excessive wind loads, calculated at high altitudes.

a. Pad 39A thermodynamic measurements taken at approximately 1.2 m (4 ft) above natural grade at camera site No. 3.
b. 1 min average prior to L+0 of 60 ft PLP (listed first) and 275 ft FSS winds measured above natural grade.
c. Pressure measurement applicable to 21 ft above MSL unless otherwise indicated.
d. Pressure measurement applicable to 14 ft above MSL.
e. 10 sec average prior to L+0.
f. Eastern Daylight Time.
g. 30 sec average prior to L+0.
h. All vehicles launched from LC39A.

TABLE 2. SYSTEMS USED TO MEASURE UPPER AIR WIND DATA FOR STS-51A ASCENT

Type of Data	Date: November 8, 1984		Portion of Data Used			
	Release Time		Start		End	
	Time (UT) (hr:min)	Time After L+0 (min)	Altitude m (ft)	Time After L+0 (min)	Altitude m (ft)	Time After L+0 (min)
FPS-16 Jimsphere	12:30	15	6 (21)	15	16,764 (55,000)	64
MSS Rawinsonde	12:18	3	17,069 (56,000)	56	29,870 (98,000)	98
Super-Loki Rocketsonde (Datasonde)	13:56	101	39,014 (128,000)	101	30,175 (99,000)	110
Super-Loki Rocketsonde (Robin)	13:15	60	83,515 (274,000)	60	39,319 (129,000)	61

TABLE 3. SURFACE OBSERVATIONS AT STS-51A LAUNCH TIME

Location[a]	Time After L+0 (min)	Pressure (MSL) N/cm² (psia)	Temperature °K (°F)	Dew Point °K (°F)	Relative Humidity (%)	Visibility km (miles)	Sky Cover			Wind	
							Cloud** Amount	Cloud Type	Height of Base Meters (ft)	Speed ft/sec (kt)	Direction (deg)
NASA Space Shuttle Runway X68[e] Winds Measured at 10.4 m (34 ft)	0	10.234 (14.843)	292.8 (67.3)	288.3 (54.8)	64	16 (10)	2	Cumulus	762 (2500)	11.8 (7.0)	20
							3	Strato-Cumulus	1158 (3800)		
CCAFS XMR[c] Surface Measurements	0	10.230 (14.837)	292.8 (67.4)	285.9 (55.0)	64	16 (10)	4	Cumulus	762 (2500)	11.8 (7.0)	20
							1	Strato-Cumulus	1372 (4500)		
Pad 39A[d] Lightpole SE 18.3 m (60.0 ft)	0	10.234* (14.843*)	293.0 (67.9)	284.8 (52.9)	59*	-	-	-	-	23.0[b] (13.6)	24[b]
Pad 39A FSS (Top SE) 83.8 m (275 ft)	0	-	-	-	-	-	-	-	-	31.1[b] (18.4)	10[b]

*Pad 39A Camera Site 3 barometric pressure instrument appeared to be reading too high (and relative humidity too low). Therefore, the KSC Shuttle runway station pressure value interpolated to 10.227 N/cm² at 21 ft above MSL was used as the L+0 pad atmospheric pressure measurement.

**5/10 total sky cover reported at both X68 and XMR.

a. Altitudes of measurements are above natural grade, except where noted.

b. Approximately 1 min average prior to L+0.

c. Balloon release site.

d. Pad 39A thermodynamic measurements are taken at camera site No. 3, approximately 6.4 m (21 ft) above MSL.

e. Official STS-51A sky observational site.

TABLE 4. STS-51A PRE-LAUNCH THROUGH LAUNCH KSC PAD 39A ATMOSPHERIC MEASUREMENTS[a]

Hourly Atmospheric Measurements									Sky Condition[b]			
8 November 1984 Time UT		Temp. (°F)	Dew[d] Point (°F)	RH[d] (%)	275' Level (SE)		60' Level (SE)		Clouds	Total Sky Cover	Vis. (mi)	Other Remarks
					WS Kt	WD°	WS Kt	WD°				
	0600	57	47	70	10*	280*	10	287	Thin broken at 25,000 ft	6/10	10	
	0700	54	49	84	9*	282*	8	278	Scattered at 4500 ft and thin broken at 25,000 ft	6/10	10	
	0800	57	52	85	6*	289*	7	274	Scattered at 2000 ft and broken at 3300 ft	9/10	10	
	0900	67	59	76	14	018	14	035	Scattered at 2000 ft and broken at 3800 ft	9/10	10	
	1000	67	50	55	14	00°	14	034	Scattered at 2000 ft and broken at 4500 ft	9/10	10	
	1100	67	48	50	15	007	15	020	Scattered at 2000 and 4000 ft	5/10	10	
	1200	67	47	49	13	358	11	026	Scattered at 2500 and 3800 ft	5/10	10	
L+0[c]	1215	68	53	59	18	010	14	024	Scattered at 2500 and 3800 ft	5/10	10	

*NW anomometer used for wind conditions.

a. Hourly pad observations (obtained via MSFC/HOSC) averaged over 1 min, centered on the hour.

b. Sky observations taken at the Shuttle runway site X68.

c. L+0 PAD Wind and thermodynamic parameters obtained from HOSC data bank. SE Anemometers used at 60 and 275 ft levels for L+0 wind conditions (approximately 1 min average prior to L+0). Pad 39A L+0 atmospheric pressure, at 21 ft (MSL), was 10.227 N/cm^2. Sea level pressure was 10.234 N/cm^2.

d. Since Pad 39A moisture values appear low, the values given for L+0 have been adjusted.

TABLE 5. STS-51A ASCENT ATMOSPHERIC DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
000021	013	020	19.9	.1023+04	.1210+04	11.6
000100	024	020	19.7	.1020+04	.1207+04	11.5
000200	027	015	19.4	.1016+04	.1204+04	11.3
000300	031	019	19.1	.1013+04	.1201+04	11.1
000400	030	030	18.8	.1009+04	.1198+04	11.0
000500	031	030	18.5	.1005+04	.1195+04	10.8
000600	029	029	18.2	.1002+04	.1192+04	10.7
000700	028	024	18.0	.9982+03	.1189+04	10.5
000800	025	021	17.7	.9947+03	.1186+04	10.3
000900	028	024	17.4	.9911+03	.1183+04	10.2
001000	028	030	17.1	.9876+03	.1180+04	10.0
001100	027	030	16.8	.9841+03	.1177+04	9.9
001200	028	025	16.5	.9805+03	.1174+04	9.9
001300	027	025	16.2	.9770+03	.1171+04	9.8
001400	028	026	15.9	.9735+03	.1168+04	9.7
001500	029	024	15.6	.9701+03	.1165+04	9.7
001600	026	027	15.2	.9666+03	.1162+04	9.6
001700	028	027	14.9	.9631+03	.1159+04	9.5
001800	028	023	14.6	.9597+03	.1156+04	9.4
001900	026	025	14.3	.9563+03	.1153+04	9.4
002000	025	029	14.0	.9528+03	.1151+04	9.3
002100	028	024	13.7	.9494+03	.1148+04	9.2
002200	025	024	13.4	.9460+03	.1145+04	9.2
002300	026	028	13.2	.9425+03	.1141+04	9.1
002400	027	031	12.9	.9391+03	.1138+04	9.1
002500	029	031	12.6	.9357+03	.1135+04	9.0
002600	027	036	12.3	.9324+03	.1132+04	8.9
002700	029	039	12.0	.9290+03	.1130+04	8.9
002800	032	040	11.8	.9256+03	.1127+04	8.8
002900	032	033	11.5	.9223+03	.1124+04	8.8
003000	029	031	11.2	.9190+03	.1121+04	8.7
003100	029	035	11.0	.9156+03	.1117+04	8.6
003200	031	031	10.7	.9123+03	.1114+04	8.6
003300	031	026	10.5	.9089+03	.1111+04	8.5
003400	029	027	10.2	.9056+03	.1108+04	8.5
003500	031	032	10.0	.9023+03	.1105+04	8.4
003600	031	029	9.8	.8990+03	.1102+04	8.3
003700	028	032	9.5	.8958+03	.1099+04	8.3
003800	027	037	9.3	.8925+03	.1096+04	8.2
003900	030	035	9.0	.8893+03	.1093+04	8.2
004000	027	039	8.8	.8860+03	.1090+04	8.1
004100	025	038	8.6	.8828+03	.1087+04	7.9
004200	026	042	8.4	.8795+03	.1083+04	7.8
004300	027	044	8.1	.8763+03	.1080+04	7.6
004400	024	041	7.9	.8731+03	.1077+04	7.5
004500	022	048	7.7	.8698+03	.1074+04	7.3
004600	024	049	7.5	.8666+03	.1071+04	7.2
004700	025	055	7.3	.8635+03	.1068+04	7.0
004800	023	051	7.0	.8603+03	.1065+04	6.9
004900	019	050	6.8	.8571+03	.1062+04	6.8

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
005000	016	060	6.6	.8540+03	.1059+04	6.6
005100	015	076	6.4	.8508+03	.1056+04	6.4
005200	016	070	6.1	.8477+03	.1053+04	6.1
005300	020	060	5.9	.8445+03	.1050+04	5.9
005400	017	059	5.6	.8414+03	.1047+04	5.6
005500	015	065	5.4	.8383+03	.1044+04	5.4
005600	017	074	5.2	.8352+03	.1041+04	5.2
005700	018	068	4.9	.8321+03	.1038+04	4.9
005800	015	064	4.7	.8290+03	.1035+04	4.7
005900	015	073	4.4	.8259+03	.1033+04	4.4
006000	018	077	4.2	.8228+03	.1030+04	4.2
006100	019	074	4.0	.8198+03	.1027+04	3.2
006200	015	068	3.8	.8167+03	.1024+04	2.3
006300	014	074	3.7	.8136+03	.1021+04	1.3
006400	018	079	3.5	.8106+03	.1018+04	.4
006500	018	076	3.3	.8076+03	.1015+04	-.6
006600	016	084	3.1	.8045+03	.1012+04	-1.6
006700	018	086	2.9	.8015+03	.1009+04	-2.5
006800	018	074	2.8	.7985+03	.1006+04	-3.5
006900	015	053	2.6	.7955+03	.1003+04	-4.4
007000	018	022	2.4	.7926+03	.1000+04	-5.4
007100	019	005	2.9	.7896+03	.9947+03	-6.4
007200	021	014	3.4	.7867+03	.9893+03	-7.4
007300	025	016	3.9	.7838+03	.9840+03	-8.4
007400	030	009	4.4	.7809+03	.9787+03	-9.4
007500	032	008	4.9	.7780+03	.9734+03	-10.4
007600	033	012	5.4	.7751+03	.9682+03	-11.5
007700	037	017	5.9	.7722+03	.9629+03	-12.5
007800	037	015	6.4	.7694+03	.9577+03	-13.5
007900	036	010	6.9	.7665+03	.9526+03	-14.5
008000	036	002	7.4	.7637+03	.9474+03	-15.5
008100	034	359	7.3	.7608+03	.9444+03	-15.5
008200	035	358	7.1	.7580+03	.9413+03	-15.5
008300	037	003	7.0	.7552+03	.9383+03	-15.5
008400	036	000	6.8	.7524+03	.9353+03	-15.5
008500	035	357	6.7	.7496+03	.9323+03	-15.5
008600	031	354	6.6	.7469+03	.9293+03	-15.4
008700	031	359	6.4	.7441+03	.9263+03	-15.4
008800	033	359	6.3	.7413+03	.9234+03	-15.4
008900	032	355	6.1	.7386+03	.9204+03	-15.4
009000	029	352	6.0	.7359+03	.9175+03	-15.4
009100	029	356	5.9	.7331+03	.9145+03	-15.5
009200	030	356	5.7	.7304+03	.9115+03	-15.6
009300	034	348	5.6	.7277+03	.9086+03	-15.7
009400	034	349	5.5	.7250+03	.9056+03	-15.8
009500	039	354	5.4	.7223+03	.9027+03	-15.9
009600	044	354	5.2	.7196+03	.8997+03	-16.1
009700	042	352	5.1	.7169+03	.8968+03	-16.2
009800	041	356	5.0	.7143+03	.8939+03	-16.3
009900	044	000	4.8	.7116+03	.8910+03	-16.4

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
010000	044	357	4.7	.7090+03	.8881+03	-16.5
010100	040	355	4.4	.7063+03	.8855+03	-16.0
010200	040	358	4.2	.7037+03	.8830+03	-15.5
010300	042	001	3.9	.7010+03	.8804+03	-15.0
010400	036	356	3.7	.6984+03	.8779+03	-14.5
010500	036	356	3.4	.6958+03	.8754+03	-14.1
010600	037	359	3.2	.6932+03	.8728+03	-13.6
010700	037	357	2.9	.6906+03	.8703+03	-13.1
010800	035	357	2.7	.6880+03	.8678+03	-12.6
010900	034	002	2.4	.6855+03	.8653+03	-12.1
011000	034	004	2.2	.6829+03	.8628+03	-11.6
011100	033	000	2.0	.6803+03	.8602+03	-11.7
011200	030	005	1.8	.6777+03	.8576+03	-11.8
011300	031	008	1.6	.6752+03	.8550+03	-11.9
011400	031	008	1.4	.6726+03	.8524+03	-12.0
011500	031	012	1.2	.6701+03	.8499+03	-12.1
011600	032	011	.9	.6676+03	.8473+03	-12.2
011700	030	004	.7	.6651+03	.8448+03	-12.3
011800	029	000	.5	.6625+03	.8423+03	-12.4
011900	030	000	.3	.6601+03	.8397+03	-12.5
012000	029	348	.1	.6576+03	.8372+03	-12.6
012100	027	347	.0	.6551+03	.8345+03	-13.1
012200	028	345	-.2	.6526+03	.8318+03	-13.6
012300	027	340	-.3	.6501+03	.8291+03	-14.1
012400	027	344	-.5	.6476+03	.8264+03	-14.6
012500	030	345	-.6	.6452+03	.8237+03	-15.0
012600	033	339	-.7	.6427+03	.8210+03	-15.5
012700	032	343	-.9	.6403+03	.8184+03	-16.0
012800	033	343	-1.0	.6378+03	.8157+03	-16.5
012900	037	340	-1.2	.6354+03	.8131+03	-17.0
013000	036	343	-1.3	.6330+03	.8104+03	-17.5
013100	037	336	-1.4	.6306+03	.8078+03	-17.9
013200	035	336	-1.6	.6282+03	.8052+03	-18.4
013300	034	338	-1.7	.6258+03	.8026+03	-18.8
013400	034	333	-1.9	.6234+03	.8000+03	-19.3
013500	030	330	-2.0	.6210+03	.7974+03	-19.8
013600	029	334	-2.2	.6186+03	.7948+03	-20.2
013700	032	324	-2.3	.6163+03	.7922+03	-20.6
013800	031	324	-2.5	.6139+03	.7897+03	-21.1
013900	031	325	-2.6	.6116+03	.7871+03	-21.5
014000	030	321	-2.8	.6093+03	.7846+03	-22.0
014100	028	326	-3.0	.6069+03	.7820+03	-22.1
014200	032	326	-3.1	.6046+03	.7795+03	-22.2
014300	032	320	-3.3	.6023+03	.7769+03	-22.4
014400	033	322	-3.4	.5999+03	.7744+03	-22.5
014500	036	320	-3.6	.5976+03	.7719+03	-22.6
014600	036	318	-3.8	.5954+03	.7694+03	-22.7
014700	033	323	-3.9	.5931+03	.7669+03	-22.8
014800	036	316	-4.1	.5908+03	.7644+03	-23.0
014900	035	310	-4.2	.5885+03	.7619+03	-23.1

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
015000	035	315	-4.4	.5863+03	.7595+03	-23.2
015100	038	313	-4.6	.5840+03	.7571+03	-23.4
015200	038	315	-4.8	.5817+03	.7547+03	-23.6
015300	039	319	-5.0	.5795+03	.7523+03	-23.7
015400	038	315	-5.2	.5773+03	.7500+03	-23.9
015500	037	317	-5.3	.5750+03	.7476+03	-24.1
015600	037	319	-5.5	.5728+03	.7452+03	-24.3
015700	039	316	-5.7	.5706+03	.7429+03	-24.5
015800	037	316	-5.9	.5684+03	.7406+03	-24.6
015900	035	320	-6.1	.5662+03	.7382+03	-24.8
016000	038	322	-6.3	.5640+03	.7359+03	-25.0
016100	038	319	-6.5	.5618+03	.7337+03	-24.9
016200	036	322	-6.8	.5596+03	.7314+03	-24.7
016300	038	323	-7.0	.5574+03	.7292+03	-24.6
016400	040	318	-7.2	.5553+03	.7270+03	-24.4
016500	038	318	-7.4	.5531+03	.7248+03	-24.3
016600	039	320	-7.7	.5510+03	.7226+03	-24.2
016700	042	319	-7.9	.5488+03	.7204+03	-24.0
016800	039	317	-8.1	.5467+03	.7182+03	-23.9
016900	040	321	-8.4	.5445+03	.7160+03	-23.7
017000	041	316	-8.6	.5424+03	.7138+03	-23.6
017100	042	316	-8.8	.5403+03	.7117+03	-23.7
017200	041	320	-9.1	.5382+03	.7095+03	-23.8
017300	043	319	-9.3	.5361+03	.7074+03	-23.9
017400	044	317	-9.6	.5339+03	.7052+03	-24.0
017500	042	317	-9.8	.5318+03	.7031+03	-24.1
017600	040	317	-10.0	.5298+03	.7010+03	-24.2
017700	044	313	-10.3	.5277+03	.6989+03	-24.3
017800	041	309	-10.5	.5256+03	.6968+03	-24.4
017900	042	313	-10.8	.5235+03	.6947+03	-24.5
018000	045	309	-11.0	.5215+03	.6926+03	-24.6
018100	043	308	-11.3	.5194+03	.6905+03	-24.8
018200	041	307	-11.5	.5174+03	.6884+03	-25.0
018300	042	307	-11.8	.5153+03	.6863+03	-25.2
018400	046	302	-12.0	.5133+03	.6843+03	-25.4
018500	044	297	-12.3	.5112+03	.6822+03	-25.6
018600	041	299	-12.5	.5092+03	.6802+03	-25.8
018700	043	300	-12.8	.5072+03	.6781+03	-26.0
018800	040	295	-13.0	.5052+03	.6761+03	-26.2
018900	039	298	-13.3	.5032+03	.6741+03	-26.4
019000	041	299	-13.5	.5012+03	.6720+03	-26.6
019100	045	297	-13.7	.4992+03	.6700+03	-26.8
019200	038	297	-14.0	.4972+03	.6679+03	-26.9
019300	039	299	-14.2	.4952+03	.6659+03	-27.1
019400	042	295	-14.5	.4932+03	.6638+03	-27.2
019500	040	292	-14.7	.4912+03	.6618+03	-27.4
019600	042	292	-14.9	.4892+03	.6597+03	-27.6
019700	045	292	-15.2	.4873+03	.6577+03	-27.7
019800	044	292	-15.4	.4853+03	.6557+03	-27.9
019900	042	296	-15.7	.4834+03	.6537+03	-28.0

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (M/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
020000	05	296	-15.9	.4815+03	.6517+03	-28.2
020100	046	294	-16.1	.4795+03	.6496+03	-28.5
020200	042	294	-16.3	.4776+03	.6475+03	-28.8
020300	045	295	-16.5	.4756+03	.6454+03	-29.0
020400	048	294	-16.7	.4737+03	.6433+03	-29.3
020500	047	294	-16.9	.4718+03	.6413+03	-29.6
020600	051	298	-17.2	.4699+03	.6392+03	-29.9
020700	053	296	-17.4	.4680+03	.6372+03	-30.2
020800	048	295	-17.6	.4661+03	.6351+03	-30.4
020900	047	292	-17.8	.4642+03	.6331+03	-30.7
021000	048	289	-18.0	.4624+03	.6310+03	-31.0
021100	046	285	-18.1	.4605+03	.6289+03	-31.2
021200	046	287	-18.3	.4586+03	.6267+03	-31.3
021300	046	283	-18.4	.4567+03	.6245+03	-31.5
021400	046	284	-18.6	.4549+03	.6223+03	-31.7
021500	048	284	-18.8	.4530+03	.6201+03	-31.8
021600	050	283	-18.9	.4512+03	.6180+03	-32.0
021700	048	287	-19.0	.4494+03	.6158+03	-32.2
021800	052	290	-19.2	.4475+03	.6137+03	-32.4
021900	050	285	-19.3	.4457+03	.6116+03	-32.5
022000	051	287	-19.5	.4439+03	.6094+03	-32.7
022100	054	290	-19.6	.4421+03	.6071+03	-32.6
022200	055	288	-19.7	.4403+03	.6049+03	-32.6
022300	055	291	-19.7	.4385+03	.6026+03	-32.5
022400	057	293	-19.8	.4367+03	.6003+03	-32.5
022500	059	289	-19.9	.4349+03	.5980+03	-32.4
022600	061	289	-20.0	.4331+03	.5958+03	-32.3
022700	067	290	-20.1	.4314+03	.5935+03	-32.3
022800	067	289	-20.1	.4296+03	.5913+03	-32.2
022900	067	291	-20.2	.4278+03	.5891+03	-32.2
023000	069	290	-20.3	.4261+03	.5868+03	-32.1
023100	068	288	-20.4	.4243+03	.5848+03	-32.1
023200	069	288	-20.6	.4226+03	.5827+03	-32.2
023300	074	285	-20.7	.4209+03	.5807+03	-32.2
023400	072	284	-20.9	.4191+03	.5786+03	-32.3
023500	075	284	-21.0	.4174+03	.5766+03	-32.3
023600	076	285	-21.2	.4157+03	.5746+03	-32.4
023700	075	285	-21.3	.4140+03	.5726+03	-32.4
023800	077	285	-21.5	.4123+03	.5706+03	-32.5
023900	077	284	-21.6	.4106+03	.5686+03	-32.5
024000	075	284	-21.8	.4089+03	.5666+03	-32.6
024100	076	284	-22.0	.4072+03	.5647+03	-32.8
024200	072	283	-22.3	.4056+03	.5629+03	-33.0
024300	077	283	-22.5	.4039+03	.5611+03	-33.1
024400	076	283	-22.7	.4022+03	.5593+03	-33.3
024500	073	285	-22.9	.4005+03	.5575+03	-33.5
024600	077	285	-23.2	.3989+03	.5557+03	-33.7
024700	075	285	-23.4	.3972+03	.5539+03	-33.9
024800	075	285	-23.6	.3956+03	.5522+03	-34.0
024900	075	282	-23.9	.3940+03	.5504+03	-34.2

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
025000	075	282	-24.1	.3923+03	.5486+03	-34.4
025100	075	281	-24.3	.3907+03	.5468+03	-34.2
025200	074	279	-24.5	.3891+03	.5449+03	-34.0
025300	078	279	-24.7	.3875+03	.5431+03	-33.8
025400	076	277	-24.9	.3858+03	.5413+03	-33.6
025500	076	279	-25.1	.3842+03	.5394+03	-33.4
025600	079	280	-25.3	.3826+03	.5376+03	-33.2
025700	078	281	-25.5	.3810+03	.5358+03	-33.0
025800	081	284	-25.7	.3795+03	.5340+03	-32.8
025900	078	283	-25.9	.3779+03	.5322+03	-32.6
026000	079	284	-26.1	.3763+03	.5304+03	-32.4
026100	081	283	-26.4	.3747+03	.5287+03	-32.5
026200	078	283	-26.6	.3731+03	.5271+03	-32.6
026300	079	285	-26.9	.3716+03	.5254+03	-32.7
026400	081	285	-27.1	.3700+03	.5238+03	-32.8
026500	082	286	-27.4	.3685+03	.5221+03	-32.9
026600	084	286	-27.7	.3669+03	.5205+03	-33.1
026700	083	286	-27.9	.3654+03	.5188+03	-33.2
026800	088	287	-28.2	.3638+03	.5172+03	-33.3
026900	090	286	-28.4	.3623+03	.5156+03	-33.4
027000	088	288	-28.7	.3608+03	.5139+03	-33.5
027100	091	288	-28.9	.3592+03	.5123+03	-33.8
027200	093	286	-29.2	.3577+03	.5106+03	-34.0
027300	094	286	-29.4	.3562+03	.5089+03	-34.3
027400	098	287	-29.7	.3547+03	.5073+03	-34.6
027500	100	286	-29.9	.3532+03	.5056+03	-34.8
027600	096	285	-30.1	.3517+03	.5040+03	-35.1
027700	099	285	-30.4	.3502+03	.5023+03	-35.4
027800	098	283	-30.6	.3487+03	.5007+03	-35.7
027900	098	283	-30.9	.3472+03	.4990+03	-35.9
028000	100	282	-31.1	.3457+03	.4974+03	-36.2
028100	097	281	-31.3	.3442+03	.4957+03	-36.5
028200	099	282	-31.5	.3427+03	.4941+03	-36.8
028300	100	280	-31.8	.3413+03	.4924+03	-37.1
028400	101	282	-32.0	.3398+03	.4907+03	-37.4
028500	103	282	-32.2	.3384+03	.4891+03	-37.7
028600	103	282	-32.4	.3369+03	.4874+03	-38.0
028700	107	282	-32.6	.3355+03	.4858+03	-38.3
028800	109	280	-32.9	.3340+03	.4841+03	-38.6
028900	108	280	-33.1	.3326+03	.4825+03	-38.9
029000	110	280	-33.3	.3312+03	.4809+03	-39.2
029100	110	281	-33.5	.3297+03	.4793+03	-39.4
029200	113	280	-33.8	.3283+03	.4777+03	-39.7
029300	112	280	-34.0	.3269+03	.4762+03	-39.9
029400	113	282	-34.3	.3255+03	.4746+03	-40.2
029500	114	282	-34.5	.3240+03	.4730+03	-40.4
029600	115	282	-34.8	.3226+03	.4715+03	-40.6
029700	118	282	-35.0	.3212+03	.4699+03	-40.9
029800	116	283	-35.3	.3199+03	.4684+03	-41.1
029900	119	283	-35.5	.3185+03	.4668+03	-41.4

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
030000	118	281	-35.8	.3171+03	.4653+03	-41.6
030100	120	282	-36.0	.3157+03	.4638+03	-41.8
030200	123	281	-36.3	.3143+03	.4622+03	-42.1
030300	119	281	-36.5	.3129+03	.4607+03	-42.3
030400	121	280	-36.8	.3116+03	.4592+03	-42.6
030500	123	278	-37.0	.3102+03	.4576+03	-42.8
030600	122	279	-37.3	.3088+03	.4561+03	-43.1
030700	122	279	-37.5	.3075+03	.4546+03	-43.3
030800	121	278	-37.8	.3061+03	.4531+03	-43.6
030900	120	279	-38.0	.3048+03	.4516+03	-43.8
031000	124	279	-38.3	.3035+03	.4501+03	-44.1
031100	123	278	-38.5	.3021+03	.4484+03	-44.4
031200	121	279	-38.6	.3008+03	.4468+03	-44.8
031300	126	278	-38.8	.2995+03	.4451+03	-45.1
031400	126	277	-39.0	.2981+03	.4435+03	-45.5
031500	125	278	-39.1	.2968+03	.4418+03	-45.8
031600	125	277	-39.3	.2955+03	.4402+03	-46.1
031700	125	277	-39.5	.2942+03	.4386+03	-46.5
031800	126	276	-39.7	.2929+03	.4370+03	-46.8
031900	123	276	-39.8	.2916+03	.4354+03	-47.2
032000	121	276	-40.0	.2903+03	.4338+03	-47.5
032100	125	276	-40.2	.2890+03	.4322+03	-47.8
032200	125	276	-40.4	.2878+03	.4306+03	-48.1
032300	126	275	-40.6	.2865+03	.4291+03	-48.4
032400	125	275	-40.8	.2852+03	.4276+03	-48.7
032500	125	273	-41.0	.2839+03	.4260+03	-49.0
032600	129	273	-41.2	.2827+03	.4245+03	-49.3
032700	131	272	-41.4	.2814+03	.4230+03	-49.6
032800	128	273	-41.6	.2802+03	.4215+03	-49.9
032900	126	272	-41.8	.2789+03	.4200+03	-50.2
033000	131	270	-42.0	.2777+03	.4184+03	-50.5
033100	131	272	-42.1	.2764+03	.4167+03	-50.7
033200	128	274	-42.2	.2752+03	.4150+03	-51.0
033300	124	273	-42.3	.2740+03	.4133+03	-51.2
033400	124	273	-42.4	.2727+03	.4116+03	-51.5
033500	120	272	-42.4	.2715+03	.4100+03	-51.7
033600	115	275	-42.5	.2703+03	.4083+03	-51.9
033700	117	277	-42.6	.2691+03	.4066+03	-52.2
033800	117	279	-42.7	.2679+03	.4050+03	-52.4
033900	118	277	-42.8	.2667+03	.4033+03	-52.7
034000	119	280	-42.9	.2655+03	.4016+03	-52.9
034100	120	279	-42.9	.2643+03	.3998+03	-53.1
034200	121	276	-42.9	.2631+03	.3980+03	-53.2
034300	117	280	-42.9	.2619+03	.3963+03	-53.4
034400	120	277	-42.9	.2607+03	.3945+03	-53.6
034500	116	280	-42.9	.2596+03	.3927+03	-53.7
034600	115	280	-42.9	.2584+03	.3910+03	-53.9
034700	116	281	-42.9	.2572+03	.3892+03	-54.1
034800	116	281	-42.9	.2561+03	.3874+03	-54.3
034900	114	282	-42.9	.2549+03	.3857+03	-54.4

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
035000	113	283	-42.9	.2538+03	.3840+03	-54.6
035100	112	283	-43.1	.2527+03	.3826+03	-54.6
035200	10?	288	-43.3	.2515+03	.3812+03	-54.6
035300	110	286	-43.5	.2504+03	.3798+03	-54.6
035400	111	285	-43.7	.2493+03	.3784+03	-54.6
035500	110	287	-43.9	.2481+03	.3770+03	-54.6
035600	110	287	-44.1	.2470+03	.3757+03	-54.7
035700	110	288	-44.3	.2459+03	.3743+03	-54.7
035800	109	287	-44.5	.2448+03	.3729+03	-54.7
035900	108	287	-44.7	.2437+03	.3716+03	-54.7
036000	108	287	-44.9	.2426+03	.3702+03	-54.7
036100	106	286	-45.1	.2415+03	.3688+03	-55.0
036200	106	288	-45.2	.2404+03	.3674+03	-55.2
036300	103	288	-45.4	.2393+03	.3660+03	-55.5
036400	102	288	-45.5	.2382+03	.3646+03	-55.8
036500	102	288	-45.7	.2371+03	.3632+03	-56.0
036600	103	287	-45.9	.2361+03	.3618+03	-56.3
036700	102	289	-46.0	.2350+03	.3604+03	-56.6
036800	103	288	-46.2	.2339+03	.3590+03	-56.9
036900	102	290	-46.3	.2328+03	.3576+03	-57.1
037000	101	288	-46.5	.2318+03	.3563+03	-57.4
037100	102	289	-46.7	.2307+03	.3549+03	-57.5
037200	102	289	-46.8	.2297+03	.3535+03	-57.6
037300	101	290	-47.0	.2286+03	.3521+03	-57.6
037400	099	290	-47.1	.2276+03	.3508+03	-57.7
037500	099	290	-47.3	.2265+03	.3494+03	-57.8
037600	100	290	-47.5	.2255+03	.3481+03	-57.9
037700	099	291	-47.6	.2245+03	.3467+03	-58.0
037800	098	290	-47.8	.2234+03	.3454+03	-58.0
037900	098	291	-47.9	.2224+03	.3440+03	-58.1
038000	096	292	-48.1	.2214+03	.3427+03	-58.2
038100	099	291	-48.3	.2204+03	.3414+03	-58.4
038200	098	291	-48.5	.2194+03	.3402+03	-58.6
038300	098	290	-48.7	.2184+03	.3389+03	-58.7
038400	097	291	-48.9	.2174+03	.3376+03	-58.9
038500	098	291	-49.1	.2164+03	.3364+03	-59.1
038600	098	292	-49.3	.2154+03	.3351+03	-59.3
038700	098	292	-49.5	.2144+03	.3339+03	-59.5
038800	097	293	-49.7	.2134+03	.3326+03	-59.6
038900	097	293	-49.9	.2124+03	.3314+03	-59.8
039000	096	291	-50.1	.2114+03	.3302+03	-60.0
039100	094	291	-50.3	.2104+03	.3290+03	-60.2
039200	095	291	-50.5	.2094+03	.3278+03	-60.3
039300	095	292	-50.8	.2085+03	.3266+03	-60.5
039400	094	292	-51.0	.2075+03	.3254+03	-60.6
039500	094	294	-51.2	.2065+03	.3242+03	-60.8
039600	094	296	-51.4	.2056+03	.3230+03	-61.0
039700	093	294	-51.6	.2046+03	.3218+03	-61.1
039800	092	296	-51.9	.2037+03	.3206+03	-61.3
039900	091	298	-52.1	.2027+03	.3194+03	-61.4

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
040000	090	297	-52.3	.2018+03	.3183+03	-61.6
040100	090	296	-52.5	.2008+03	.3170+03	-61.8
040200	089	295	-52.7	.1999+03	.3158+03	-62.0
040300	089	293	-52.9	.1989+03	.3146+03	-62.1
040400	089	292	-53.1	.1980+03	.3134+03	-62.3
040500	087	291	-53.2	.1971+03	.3122+03	-62.5
040600	087	292	-53.4	.1962+03	.3110+03	-62.7
040700	087	294	-53.6	.1952+03	.3098+03	-62.9
040800	087	294	-53.8	.1943+03	.3086+03	-63.0
040900	087	297	-54.0	.1934+03	.3075+03	-63.2
041000	087	295	-54.2	.1925+03	.3063+03	-63.4
041100	088	295	-54.4	.1916+03	.3051+03	-63.5
041200	088	295	-54.7	.1907+03	.3040+03	-63.7
041300	089	295	-54.9	.1898+03	.3029+03	-63.8
041400	087	294	-55.1	.1889+03	.3018+03	-64.0
041500	088	293	-55.3	.1880+03	.3007+03	-64.1
041600	089	293	-55.6	.1871+03	.2996+03	-64.3
041700	088	291	-55.8	.1862+03	.2985+03	-64.4
041800	089	291	-56.0	.1853+03	.2974+03	-64.6
041900	089	291	-56.3	.1844+03	.2963+03	-64.7
042000	091	290	-56.5	.1836+03	.2952+03	-64.9
042100	090	291	-56.7	.1827+03	.2940+03	-65.1
042200	092	291	-56.9	.1818+03	.2929+03	-65.3
042300	090	291	-57.1	.1809+03	.2917+03	-65.5
042400	090	291	-57.3	.1801+03	.2906+03	-65.7
042500	089	290	-57.4	.1792+03	.2894+03	-65.8
042600	090	290	-57.6	.1784+03	.2883+03	-66.0
042700	089	291	-57.8	.1775+03	.2872+03	-66.2
042800	089	291	-58.0	.1766+03	.2860+03	-66.4
042900	088	291	-58.2	.1758+03	.2849+03	-66.6
043000	088	292	-58.4	.1750+03	.2838+03	-66.8
043100	088	292	-58.6	.1741+03	.2827+03	-9999.
043200	087	294	-58.7	.1733+03	.2815+03	-9999.
043300	085	293	-58.9	.1724+03	.2804+03	-9999.
043400	085	293	-59.1	.1716+03	.2793+03	-9999.
043500	084	290	-59.2	.1708+03	.2781+03	-9999.
043600	083	290	-59.4	.1700+03	.2770+03	-9999.
043700	082	292	-59.6	.1691+03	.2759+03	-9999.
043800	084	289	-59.8	.1683+03	.2748+03	-9999.
043900	083	289	-59.9	.1675+03	.2737+03	-9999.
044000	084	291	-60.1	.1667+03	.2726+03	-9999.
044100	086	289	-60.2	.1659+03	.2714+03	-9999.
044200	086	289	-60.4	.1651+03	.2703+03	-9999.
044300	088	290	-60.5	.1643+03	.2692+03	-9999.
044400	091	289	-60.7	.1635+03	.2681+03	-9999.
044500	092	292	-60.8	.1627+03	.2670+03	-9999.
044600	095	290	-61.0	.1619+03	.2659+03	-9999.
044700	096	290	-61.1	.1611+03	.2648+03	-9999.
044800	098	293	-61.3	.1603+03	.2637+03	-9999.
044900	099	296	-61.4	.1596+03	.2626+03	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
045000	100	294	-61.6	.1588+03	.2615+03	-9999.
045100	101	298	-61.6	.1580+03	.2602+03	-9999.
045200	103	300	-61.7	.1572+03	.2590+03	-9999.
045300	103	301	-61.7	.1565+03	.2578+03	-9999.
045400	102	301	-61.8	.1557+03	.2566+03	-9999.
045500	103	303	-61.8	.1549+03	.2554+03	-9999.
045600	104	300	-61.8	.1542+03	.2542+03	-9999.
045700	107	302	-61.9	.1534+03	.2530+03	-9999.
045800	104	301	-61.9	.1527+03	.2518+03	-9999.
045900	101	302	-62.0	.1519+03	.2506+03	-9999.
046000	100	303	-62.0	.1512+03	.2494+03	-9999.
046100	099	302	-62.2	.1504+03	.2485+03	-9999.
046200	097	303	-62.4	.1497+03	.2475+03	-9999.
046300	094	302	-62.6	.1490+03	.2465+03	-9999.
046400	094	304	-62.8	.1482+03	.2455+03	-9999.
046500	091	304	-63.0	.1475+03	.2445+03	-9999.
046600	092	305	-63.2	.1468+03	.2436+03	-9999.
046700	091	304	-63.4	.1461+03	.2426+03	-9999.
046800	091	307	-63.6	.1454+03	.2416+03	-9999.
046900	089	307	-63.8	.1446+03	.2407+03	-9999.
047000	088	307	-64.0	.1439+03	.2397+03	-9999.
047100	088	308	-64.2	.1432+03	.2388+03	-9999.
047200	086	310	-64.4	.1425+03	.2378+03	-9999.
047300	087	312	-64.5	.1418+03	.2368+03	-9999.
047400	086	312	-64.7	.1411+03	.2358+03	-9999.
047500	083	314	-64.9	.1404+03	.2349+03	-9999.
047600	081	309	-65.1	.1397+03	.2339+03	-9999.
04	079	312	-65.3	.1390+03	.2329+03	-9999.
047800	077	311	-65.4	.1383+03	.2320+03	-9999.
047900	074	309	-65.6	.1376+03	.2310+03	-9999.
048000	072	310	-65.8	.1369+03	.2301+03	-9999.
048100	070	304	-65.9	.1363+03	.2291+03	-9999.
048200	071	306	-66.1	.1356+03	.2281+03	-9999.
048300	069	303	-66.2	.1349+03	.2271+03	-9999.
048400	069	305	-66.4	.1342+03	.2261+03	-9999.
048500	066	300	-66.5	.1336+03	.2252+03	-9999.
048600	064	301	-66.6	.1329+03	.2242+03	-9999.
048700	063	293	-66.8	.1322+03	.2232+03	-9999.
048800	063	294	-66.9	.1316+03	.2223+03	-9999.
048900	064	294	-67.1	.1309+03	.2213+03	-9999.
049000	066	291	-67.2	.1303+03	.2203+03	-9999.
049100	066	291	-67.3	.1296+03	.2193+03	-9999.
049200	069	289	-67.4	.1290+03	.2183+03	-9999.
049300	069	289	-67.5	.1283+03	.2173+03	-9999.
049400	071	288	-67.6	.1277+03	.2163+03	-9999.
049500	070	289	-67.6	.1270+03	.2153+03	-9999.
049600	071	285	-67.7	.1264+03	.2143+03	-9999.
049700	072	287	-67.8	.1258+03	.2134+03	-9999.
049800	075	283	-67.9	.1251+03	.2124+03	-9999.
049900	077	283	-68.0	.1245+03	.2114+03	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
050000	076	284	-68.1	.1239+03	.2104+03	-9999.
050100	081	285	-68.3	.1232+03	.2096+03	-9999.
050200	083	284	-68.5	.1226+03	.2088+03	-9999.
050300	083	289	-68.8	.1220+03	.2079+03	-9999.
050400	084	289	-69.0	.1214+03	.2071+03	-9999.
050500	084	291	-69.2	.1208+03	.2063+03	-9999.
050600	085	294	-69.4	.1202+03	.2055+03	-9999.
050700	082	294	-69.6	.1196+03	.2047+03	-9999.
050800	079	296	-69.9	.1189+03	.2038+03	-9999.
050900	078	297	-70.1	.1183+03	.2030+03	-9999.
051000	075	303	-70.3	.1178+03	.2022+03	-9999.
051100	075	299	-70.4	.1171+03	.2013+03	-9999.
051200	070	300	-70.6	.1166+03	.2004+03	-9999.
051300	067	301	-70.7	.1160+03	.1996+03	-9999.
051400	064	300	-70.9	.1154+03	.1987+03	-9999.
051500	060	299	-71.0	.1148+03	.1978+03	-9999.
051600	060	298	-71.1	.1142+03	.1969+03	-9999.
051700	056	303	-71.3	.1136+03	.1961+03	-9999.
051800	056	301	-71.4	.1130+03	.1952+03	-9999.
051900	054	299	-71.6	.1125+03	.1943+03	-9999.
052000	052	299	-71.7	.1119+03	.1935+03	-9999.
052100	050	299	-71.8	.1113+03	.1926+03	-9999.
052200	050	295	-72.0	.1107+03	.1918+03	-9999.
052300	051	296	-72.1	.1102+03	.1909+03	-9999.
052400	051	298	-72.3	.1096+03	.1901+03	-9999.
052500	050	301	-72.4	.1090+03	.1892+03	-9999.
052600	049	301	-72.5	.1085+03	.1884+03	-9999.
052700	049	301	-72.7	.1079+03	.1875+03	-9999.
052800	048	306	-72.8	.1074+03	.1867+03	-9999.
052900	047	306	-73.0	.1068+03	.1859+03	-9999.
053000	046	306	-73.1	.1063+03	.1850+03	-9999.
053100	045	308	-73.1	.1057+03	.1841+03	-9999.
053200	043	307	-73.2	.1052+03	.1832+03	-9999.
053300	043	310	-73.2	.1046+03	.1823+03	-9999.
053400	041	314	-73.3	.1041+03	.1814+03	-9999.
053500	040	315	-73.3	.1035+03	.1805+03	-9999.
053600	038	309	-73.3	.1030+03	.1796+03	-9999.
053700	038	307	-73.4	.1025+03	.1787+03	-9999.
053800	039	302	-73.4	.1019+03	.1778+03	-9999.
053900	039	300	-73.5	.1014+03	.1769+03	-9999.
054000	041	295	-73.5	.1009+03	.1761+03	-9999.
054100	043	292	-73.5	.1004+03	.1752+03	-9999.
054200	045	293	-73.6	.9986+02	.1743+03	-9999.
054300	047	299	-73.6	.9934+02	.1734+03	-9999.
054400	048	304	-73.7	.9883+02	.1726+03	-9999.
054500	050	310	-73.7	.9832+02	.1717+03	-9999.
054600	050	313	-73.7	.9781+02	.1709+03	-9999.
054700	050	315	-73.8	.9730+02	.1700+03	-9999.
054800	050	321	-73.8	.9680+02	.1692+03	-9999.
054900	047	322	-73.9	.9630+02	.1683+03	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
055000	043	318	-73.9	.9580+02	.1675+03	-9999.
056000	039	309	-73.9	.9096+02	.1590+03	-9999.
057000	033	312	-73.7	.8636+02	.1508+03	-9999.
058000	027	310	-73.8	.8200+02	.1433+03	-9999.
059000	026	303	-74.0	.7786+02	.1362+03	-9999.
060000	026	308	-72.7	.7393+02	.1285+03	-9999.
061000	023	322	-70.7	.7024+02	.1209+03	-9999.
062000	017	336	-69.0	.6676+02	.1139+03	-9999.
063000	011	360	-67.8	.6347+02	.1077+03	-9999.
064000	008	056	-66.5	.6037+02	.1018+03	-9999.
065000	011	093	-64.2	.5744+02	.9577+02	-9999.
066000	013	107	-64.1	.5467+02	.9110+02	-9999.
067000	012	120	-64.0	.5204+02	.8668+02	-9999.
068000	010	138	-63.8	.4953+02	.8242+02	-9999.
069000	008	154	-63.3	.4715+02	.7827+02	-9999.
070000	003	170	-63.1	.4489+02	.7445+02	-9999.
071000	003	331	-63.1	.4274+02	.7088+02	-9999.
072000	008	344	-62.7	.4069+02	.6736+02	-9999.
073000	011	356	-63.6	.3874+02	.6440+02	-9999.
074000	013	016	-61.6	.3689+02	.6075+02	-9999.
075000	014	047	-60.8	.3513+02	.5763+02	-9999.
076000	016	076	-58.6	.3348+02	.5436+02	-9999.
077000	018	088	-58.0	.3191+02	.5167+02	-9999.
078000	021	094	-57.9	.3041+02	.4922+02	-9999.
079000	025	098	-57.9	.2899+02	.4692+02	-9999.
080000	031	101	-58.0	.2763+02	.4474+02	-9999.
081000	033	104	-57.9	.2634+02	.4263+02	-9999.
082000	031	104	-56.5	.2511+02	.4038+02	-9999.
083000	029	102	-55.6	.2395+02	.3835+02	-9999.
084000	029	099	-55.5	.2284+02	.3656+02	-9999.
085000	031	098	-55.3	.2179+02	.3484+02	-9999.
086000	032	100	-54.8	.2078+02	.3315+02	-9999.
087000	032	099	-54.3	.1982+02	.3155+02	-9999.
088000	032	094	-53.6	.1891+02	.3001+02	-9999.
089000	033	090	-52.9	.1805+02	.2855+02	-9999.
090000	036	088	-52.7	.1722+02	.2721+02	-9999.
091000	041	090	-52.8	.1644+02	.2599+02	-9999.
092000	046	094	-52.3	.1569+02	.2475+02	-9999.
093000	050	099	-51.0	.1497+02	.2348+02	-9999.
094000	048	105	-49.6	.1430+02	.2228+02	-9999.
095000	042	110	-48.5	.1365+02	.2117+02	-9999.
096000	034	114	-47.8	.1304+02	.2016+02	-9999.
097000	031	111	-47.5	.1246+02	.1924+02	-9999.
098000	036	111	-47.9	.1190+02	.1840+02	-9999.
099000	038	116	-48.2	.1137+02	.1760+02	-9999.
100000	032	120	-47.8	.1086+02	.1679+02	-9999.
101000	028	115	-47.2	.1038+02	.1600+02	-9999.
102000	025	107	-46.3	.9914+01	.1522+02	-9999.
103000	021	102	-45.3	.9476+01	.1449+02	-9999.
104000	020	098	-44.4	.9058+01	.1379+02	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
105000	015	095	-43.9	.8660+01	.1316+02	-9999.
106000	011	091	-43.7	.8280+01	.1257+02	-9999.
107000	006	103	-43.8	.7916+01	.1202+02	-9999.
108000	006	140	-44.1	.7569+01	.1151+02	-9999.
109000	010	175	-44.4	.7237+01	.1102+02	-9999.
110000	018	194	-44.6	.6918+01	.1055+02	-9999.
111000	027	208	-44.5	.6614+01	.1008+02	-9999.
112000	035	224	-43.7	.6324+01	.9600+01	-9999.
113000	042	240	-42.3	.6048+01	.9126+01	-9999.
114000	046	256	-40.8	.5785+01	.8674+01	-9999.
115000	050	268	-39.5	.5536+01	.8252+01	-9999.
116000	052	274	-38.1	.5298+01	.7852+01	-9999.
117000	055	276	-36.7	.5072+01	.7471+01	-9999.
118000	059	275	-34.9	.4857+01	.7101+01	-9999.
119000	060	268	-32.5	.4654+01	.6735+01	-9999.
120000	067	262	-30.0	.4460+01	.6389+01	-9999.
121000	076	258	-27.7	.4276+01	.6069+01	-9999.
122000	087	256	-26.2	.4102+01	.5786+01	-9999.
123000	099	257	-25.1	.3935+01	.5525+01	-9999.
124000	108	259	-24.3	.3775+01	.5285+01	-9999.
125000	114	261	-23.6	.3623+01	.5057+01	-9999.
126000	119	264	-22.9	.3477+01	.4840+01	-9999.
127000	119	267	-22.2	.3338+01	.4634+01	-9999.
128000	121	269	-21.5	.3204+01	.4436+01	-9999.
129000	121	266	-21.6	.3108+01	.4305+01	-9999.
130000	119	268	-24.1	.3016+01	.4218+01	-9999.
131000	114	273	-25.9	.2926+01	.4122+01	-9999.
132000	118	275	-20.7	.2838+01	.3917+01	-9999.
133000	118	279	-17.1	.2759+01	.3747+01	-9999.
134000	106	275	-17.2	.2671+01	.3636+01	-9999.
135000	099	274	-19.3	.2592+01	.3557+01	-9999.
136000	101	267	-15.9	.2514+01	.3405+01	-9999.
137000	101	263	-13.9	.2440+01	.3278+01	-9999.
138000	099	258	-19.7	.2344+01	.3221+01	-9999.
139000	108	249	-19.7	.2251+01	.3093+01	-9999.
140000	116	245	-13.2	.2164+01	.2900+01	-9999.
141000	116	245	-15.9	.2080+01	.2816+01	-9999.
142000	121	243	-9.5	.1999+01	.2642+01	-9999.
143000	123	241	-9.0	.1[illegible]	.2537+01	-9999.
144000	121	242	-15.2	.1[illegible]	.2498+01	-9999.
145000	121	248	-11.3	.17[illegible]	.2366+01	-9999.
146000	128	256	-6.1	.17[illegible]	.2231+01	-9999.
147000	131	258	-11.3	.1686+01	.2190+01	-9999.
148000	135	252	-14.1	.1592+01	.2128+01	-9999.
149000	136	243	-9.0	.1522+01	.2008+01	-9999.
150000	141	236	-12.2	.1464+01	.1955+01	-9999.
151000	145	234	-17.2	.1408+01	.1915+01	-9999.
152000	152	234	-13.6	.1353+01	.1816+01	-9999.
153000	160	235	-12.0	.1301+01	.1735+01	-9999.
154000	168	236	-9.5	.1251+01	.1653+01	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
155000	172	238	-9.8	.1204+01	.1592+01	-9999.
156000	172	238	-7.4	.1158+01	.1518+01	-9999.
157000	175	236	-4.5	.1115+01	.1445+01	-9999.
158000	185	233	-7.9	.1073+01	.1409+01	-9999.
159000	197	232	-11.1	.1032+01	.1372+01	-9999.
160000	207	234	-11.6	.9927+00	.1322+01	-9999.
161000	217	236	-9.4	.9548+00	.1261+01	-9999.
162000	228	237	-9.8	.9183+00	.1215+01	-9999.
163000	236	236	-9.4	.8833+00	.1167+01	-9999.
164000	241	235	-11.8	.8498+00	.1133+01	-9999.
165000	244	234	-15.1	.8171+00	.1107+01	-9999.
166000	248	233	-20.2	.7852+00	.1081+01	-9999.
167000	251	233	-17.3	.7541+00	.1027+01	-9999.
168000	251	234	-12.0	.7249+00	.9671+00	-9999.
169000	248	235	-19.9	.6970+00	.9589+00	-9999.
170000	241	236	-25.3	.6695+00	.9410+00	-9999.
171000	236	237	-27.1	.6423+00	.9095+00	-9999.
172000	231	238	-29.2	.6162+00	.8798+00	-9999.
173000	228	240	-27.2	.5910+00	.8372+00	-9999.
174000	224	242	-21.5	.5673+00	.7853+00	-9999.
175000	221	244	-18.2	.5449+00	.7445+00	-9999.
176000	216	246	-22.2	.5234+00	.7264+00	-9999.
177000	212	247	-23.5	.5026+00	.7013+00	-9999.
178000	207	248	-24.2	.4824+00	.6749+00	-9999.
179000	204	248	-26.6	.4630+00	.6582+00	-9999.
180000	202	249	-26.0	.4442+00	.6261+00	-9999.
181000	200	251	-25.2	.4263+00	.5988+00	-9999.
182000	200	252	-25.2	.4092+00	.5748+00	-9999.
183000	200	254	-26.9	.3927+00	.5556+00	-9999.
184000	202	256	-26.8	.3767+00	.5326+00	-9999.
185000	204	258	-27.1	.3615+00	.5118+00	-9999.
186000	207	259	-29.1	.3468+00	.4951+00	-9999.
187000	209	261	-28.2	.3327+00	.4731+00	-9999.
188000	211	262	-28.4	.3192+00	.4543+00	-9999.
189000	214	262	-29.2	.3061+00	.4371+00	-9999.
190000	216	262	-31.2	.2935+00	.4225+00	-9999.
191000	217	260	-31.0	.2815+00	.4049+00	-9999.
192000	219	259	-28.2	.2700+00	.3840+00	-9999.
193000	221	257	-28.5	.2590+00	.3688+00	-9999.
194000	224	256	-29.2	.2484+00	.3546+00	-9999.
195000	224	255	-30.2	.2383+00	.3416+00	-9999.
196000	226	255	-30.2	.2285+00	.3277+00	-9999.
197000	228	256	-30.7	.2201+00	.3162+00	-9999.
198000	226	258	-31.3	.2115+00	.3047+00	-9999.
199000	226	260	-34.2	.2027+00	.2955+00	-9999.
200000	224	262	-33.4	.1942+00	.2821+00	-9999.
201000	221	264	-31.2	.1862+00	.2680+00	-9999.
202000	217	266	-32.0	.1785+00	.2579+00	-9999.
203000	212	269	-30.9	.1711+00	.2459+00	-9999.
204000	206	270	-31.1	.1641+00	.2361+00	-9999.

TABLE 5. (Continued)

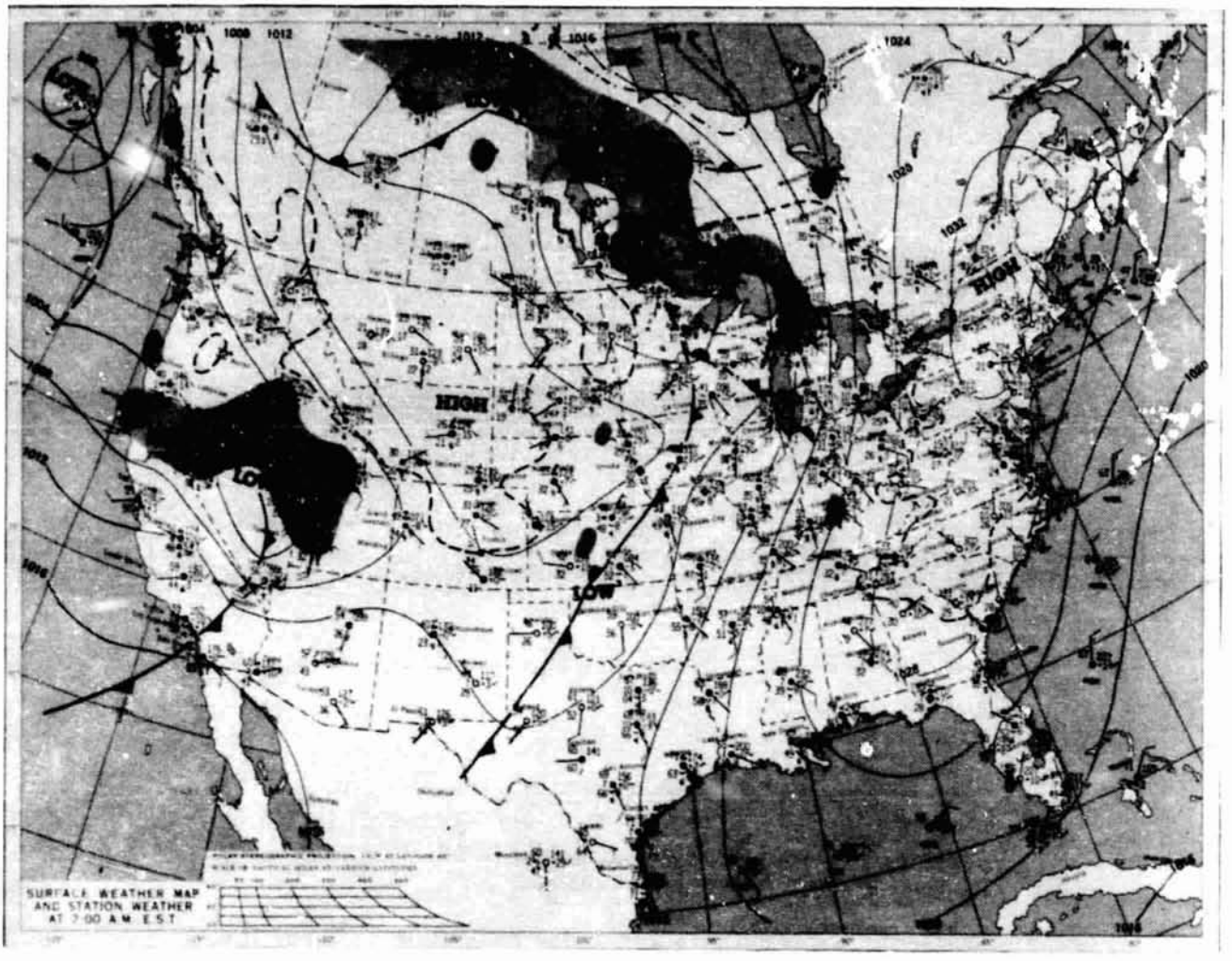
ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
205000	199	271	-32.2	.1573+00	.2274+00	-9999.
206000	189	272	-32.2	.1[illegible]+00	.2180+00	-9999.
207000	175	272	-31.1	.1445+00	.2080+00	-9999.
208000	162	272	-30.2	.1386+00	.1987+00	-9999.
209000	148	272	-31.7	.1329+00	.1917+00	-9999.
210000	135	271	-33.2	.1274+00	.1850+00	-9999.
211000	123	268	-36.3	.1221+00	.1796+00	-9999.
212000	113	265	-37.2	.1169+00	.1726+00	-9999.
213000	101	261	-36.0	.1120+00	.1645+00	-9999.
214000	092	256	-35.0	.1073+00	.1570+00	-9999.
215000	086	250	-34.2	.1028+00	.1498+00	-9999.
216000	079	242	-33.2	.9860-01	.1431+00	-9999.
217000	076	232	-32.2	.9450-01	.1366+00	-9999.
218000	079	223	-33.6	.9060-01	.1318+00	-9999.
219000	082	214	-35.9	.8680-01	.1275+00	-9999.
220000	089	207	-38.0	.8310-01	.1231+00	-9999.
221000	097	202	-42.6	.7960-01	.1203+00	-9999.
222000	103	198	-48.5	.7610-01	.1180+00	-9999.
223000	108	197	-53.5	.7270-01	.1153+00	-9999.
224000	109	196	-58.3	.6940-01	.1125+00	-9999.
225000	109	197	-62.0	.6620-01	.1092+00	-9999.
226000	108	198	-65.0	.6300-01	.1054+00	-9999.
227000	104	200	-67.1	.5990-01	.1013+00	-9999.
228000	099	202	-68.2	.5680-01	.9652-01	-9999.
229000	092	204	-68.2	.5410-01	.9194-01	-9999.
230000	082	207	-69.1	.5150-01	.8792-01	-9999.
231000	070	211	-67.2	.4910-01	.8303-01	-9999.
232000	060	216	-67.2	.4680-01	.7914-01	-9999.
233000	050	222	-67.2	.4460-01	.7542-01	-9999.
234000	037	233	-66.5	.4250-01	.7166-01	-9999.
235000	028	249	-66.2	.4040-01	.6799-01	-9999.
236000	021	275	-66.2	.3850-01	.6479-01	-9999.
237000	023	308	-67.2	.3670-01	.6206-01	-9999.
238000	030	331	-67.9	.3490-01	.5922-01	-9999.
239000	038	345	-68.4	.3320-01	.5648-01	-9999.
240000	047	354	-69.9	.3160-01	.5416-01	-9999.
241000	057	360	-71.4	.3000-01	.5181-01	-9999.
242000	067	003	-73.0	.2860-01	.4977-01	-9999.
243000	076	006	-74.5	.2710-01	.4752-01	-9999.
244000	082	008	-76.0	.2580-01	.4559-01	-9999.
245000	089	009	-77.5	.2450-01	.4363-01	-9999.
246000	092	011	-79.2	.2330-01	.4184-01	-9999.
247000	094	012	-80.6	.2210-01	.3998-01	-9999.
248000	094	013	-82.1	.2090-01	.3811-01	-9999.
249000	092	015	-83.6	.1980-01	.3640-01	-9999.
250000	091	016	-85.2	.1880-01	.3484-01	-9999.
251000	087	018	-87.7	.1780-01	.3343-01	-9999.
252000	084	019	-89.2	.1690-01	.3200-01	-9999.
253000	081	020	-89.7	.1600-01	.3039-01	-9999.
254000	077	022	-90.3	.1510-01	.2876-01	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
255000	072	023	-91.8	.1430-01	.2747-01	-9999.
256000	067	025	-92.3	.1350-01	.2600-01	-9999.
257000	062	027	-93.2	.1280-01	.2477-01	-9999.
258000	055	028	-94.3	.1210-01	.2357-01	-9999.
259000	050	031	-95.9	.1140-01	.2240-01	-9999.
260000	043	034	-96.2	.1080-01	.2126-01	-9999.
261000	038	038	-96.2	.1020-01	.2008-01	-9999.
262000	032	044	-94.9	.9600-02	.1876-01	-9999.
263000	025	054	-93.6	.9100-02	.1765-01	-9999.
264000	020	071	-92.8	.8600-02	.1661-01	-9999.
265000	018	095	-91.4	.8100-02	.1553-01	-9999.
266000	018	121	-89.8	.7700-02	.1463-01	-9999.
267000	023	140	-88.3	.7300-02	.1376-01	-9999.
268000	028	152	-85.3	.6900-02	.1280-01	-9999.
269000	033	160	-83.2	.6500-02	.1192-01	-9999.
270000	038	165	-80.2	.6200-02	.1119-01	-9999.
271000	043	169	-78.1	.5900-02	.1058-01	-9999.
272000	050	172	-74.1	.5600-02	.9800-02	-9999.
273000	055	174	-71.1	.5300-02	.9138-02	-9999.
274000	060	175	-69.0	.5100-02	.8703-02	-9999.
275000	056	175	-69.6	.4904-02	.8368-02	-9999.
276000	052	175	-70.2	.4715-02	.8046-02	-9999.
277000	047	176	-70.8	.4533-02	.7736-02	-9999.
278000	043	176	-71.4	.4359-02	.7438-02	-9999.
279000	039	177	-72.0	.4191-02	.7152-02	-9999.
280000	035	179	-72.6	.4030-02	.6876-02	-9999.
281000	031	179	-73.2	.3874-02	.6611-02	-9999.
282000	027	180	-73.8	.3725-02	.6357-02	-9999.
283000	022	182	-74.4	.3582-02	.6112-02	-9999.
284000	018	185	-74.9	.3444-02	.5877-02	-9999.
285000	014	190	-75.5	.3311-02	.5650-02	-9999.
286000	010	198	-76.1	.3184-02	.5433-02	-9999.
287000	007	214	-76.7	.3061-02	.5224-02	-9999.
288000	005	251	-77.3	.2943-02	.5023-02	-9999.
289000	006	294	-77.9	.2830-02	.4829-02	-9999.
292000	008	034	-78.5	.2430-02	.4350-02	-9999.
295000	018	054	-79.1	.2080-02	.3750-02	-9999.
298000	028	289	-78.5	.1690-02	.3030-02	-9999.
301000	034	275	-77.4	.1450-02	.2570-02	-9999.
304000	118	272	-76.2	.1240-02	.2180-02	-9999.
307000	151	271	-75.0	.1060-02	.1850-02	-9999.
310000	164	270	-73.9	.9050-03	.1570-02	-9999.
313000	160	269	-72.4	.7760-03	.1330-02	-9999.
316000	159	269	-70.4	.6680-03	.1130-02	-9999.
319000	152	269	-68.4	.5750-03	.9610-03	-9999.
322000	138	269	-66.4	.4950-03	.8170-03	-9999.
325000	115	269	-64.5	.4260-03	.6940-03	-9999.
328000	079	268	-62.5	.3670-03	.5900-03	-9999.
331000	073	268	-59.8	.3160-03	.5010-03	-9999.
334000	064	268	-57.1	.2730-03	.4250-03	-9999.

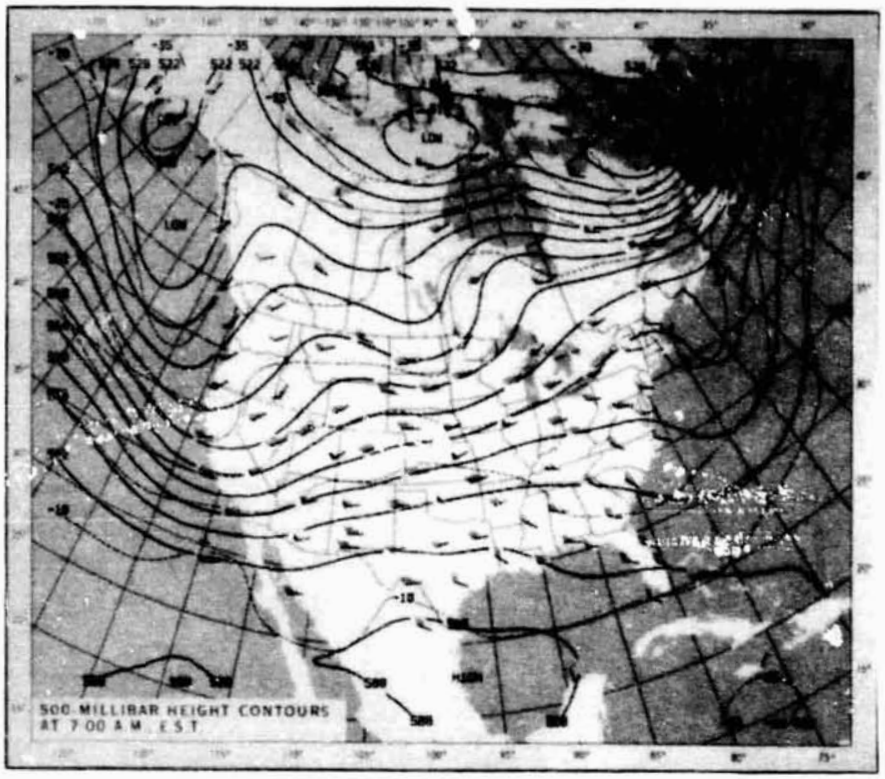
TABLE 5. (Concluded)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
337000	050	266	-54.3	.2350-03	.3610-03	-9999.
340000	028	261	-51.6	.2030-03	.3070-03	-9999.
343000	006	159	-48.9	.1750-03	.2600-03	-9999.
346000	023	099	-45.4	.1510-03	.2220-03	-9999.
349000	025	102	-41.3	.1320-03	.1890-03	-9999.
352000	028	105	-37.1	.1150-03	.1620-03	-9999.
355000	032	108	-33.0	.1000-03	.1380-03	-9999.
358000	036	112	-28.8	.8730-04	.1180-03	-9999.
361000	037	103	-24.6	.7610-04	.1010-03	-9999.
364000	040	106	-18.1	.6790-04	.8750-04	-9999.
367000	042	111	-11.6	.6060-04	.7590-04	-9999.
370000	045	116	-5.2	.5400-04	.6580-04	-9999.
373000	049	122	1.3	.4810-04	.5710-04	-9999.
376000	052	129	7.8	.4280-04	.4950-04	-9999.
379000	043	115	15.3	.3850-04	.4320-04	-9999.
382000	043	119	23.8	.3500-04	.3810-04	-9999.
385000	043	122	32.6	.3190-04	.3360-04	-9999.
388000	043	126	41.7	.2920-04	.2980-04	-9999.
391000	043	130	51.0	.2680-04	.2650-04	-9999.
394000	044	134	60.5	.2470-04	.2360-04	-9999.
397000	045	138	70.2	.2270-04	.2110-04	-9999.
400000	046	142	80.1	.2100-04	.1890-04	-9999.



Surface Synoptic Map at 1200 UT November 8, 1984 — Isobaric, Frontal, and Precipitation Patterns are Shown in Standard Symbolic Form.

Figure 1. Surface synoptic chart 15 min prior to launch of STS-51A.



500 Millibar Height
Contours at 1200 UT
November 8, 1984.
Continuous Lines Indicate Height Contours In Feet Above Sea Level. Dashed Lines are Isotherms In Degrees Centigrade. Arrows Show Wind Direction and Speed at the 500 MB Level.

Figure 2. 500 mb map 15 min prior to launch of STS-51A.

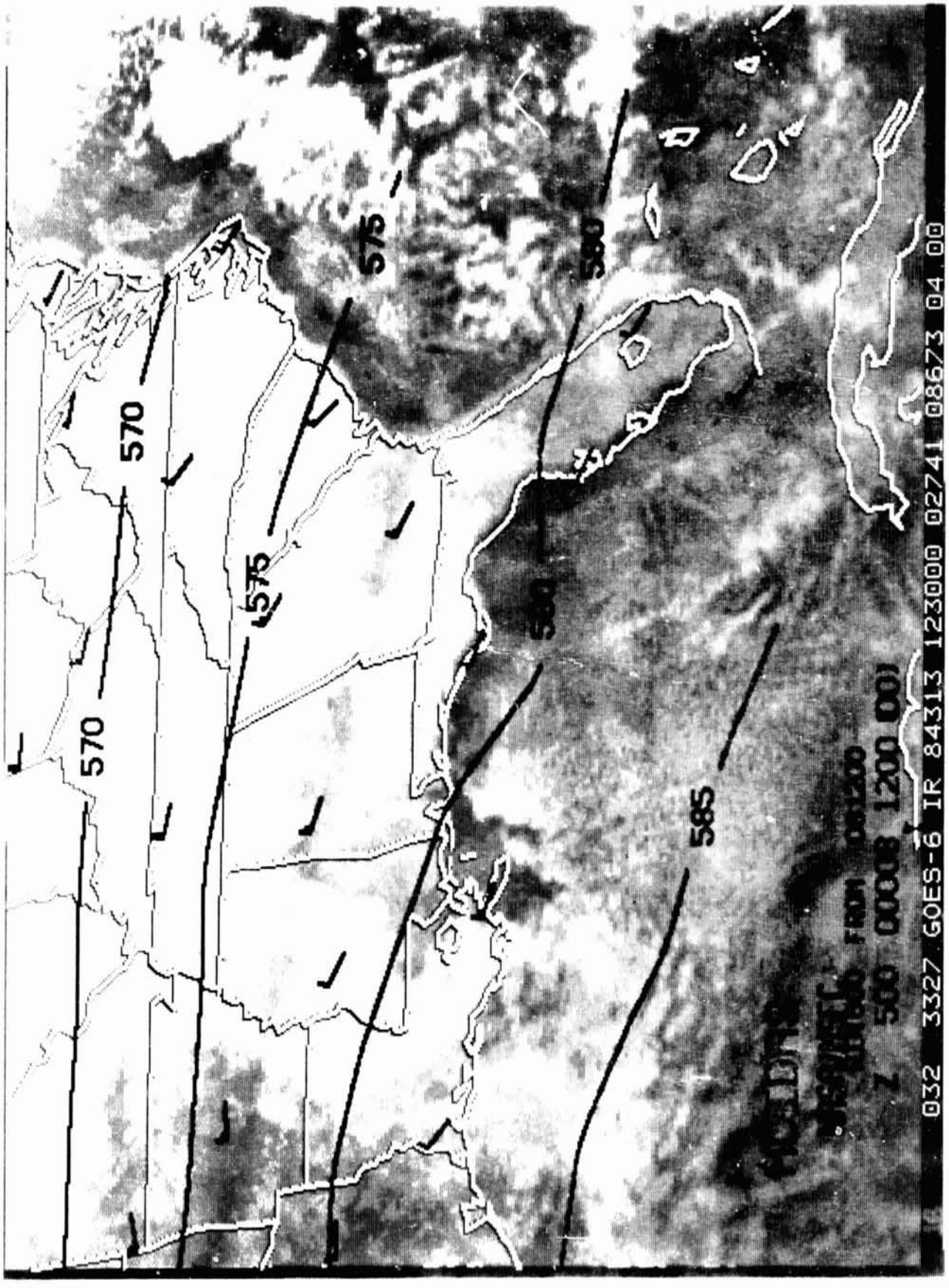


Figure 3. GOES-6 infrared imagery of cloud cover 15 min after launch of STS-51A (1230 UT, November 8, 1984). 500-mb contours and wind barbs are also included for 1200 UT.

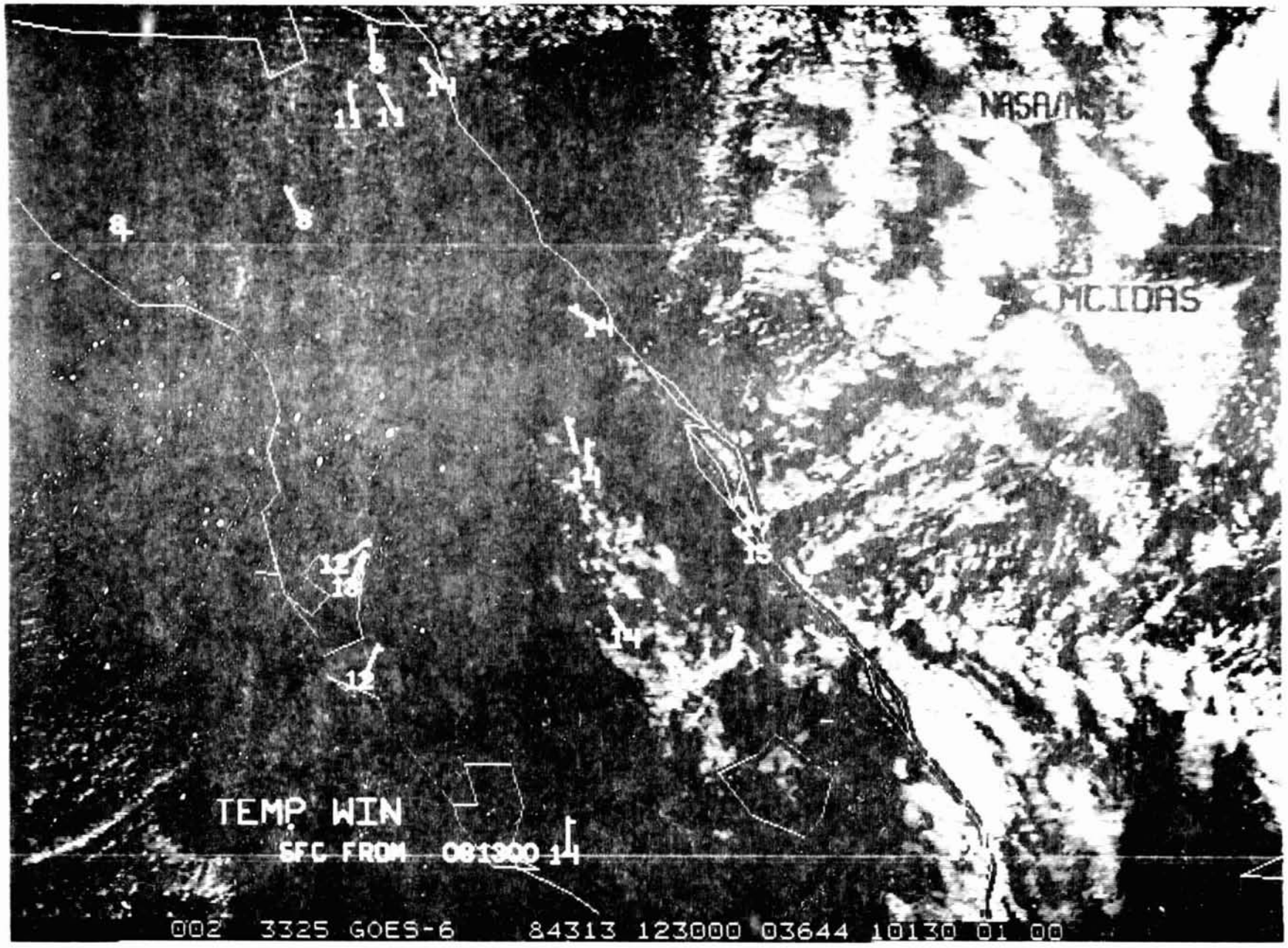


Figure 4. Enlarged view of GOES-6 visible imagery of cloud cover taken 15 min after launch of STS-51A (1230 UT, November 8, 1984). Surface temperatures and wind barbs for 1300 UT are also included).

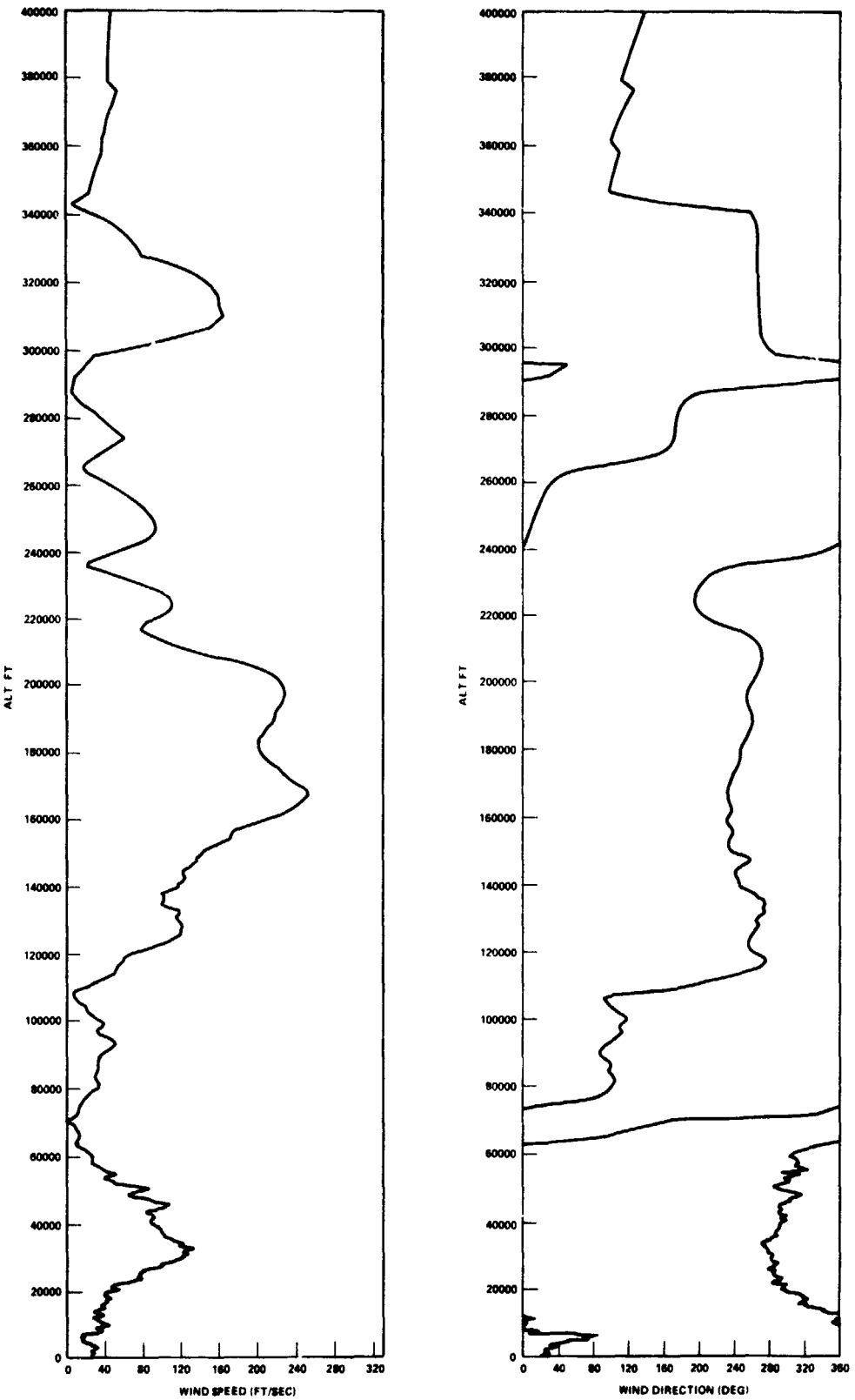


Figure 5. Scalar wind speed and direction at launch time of STS-51A.

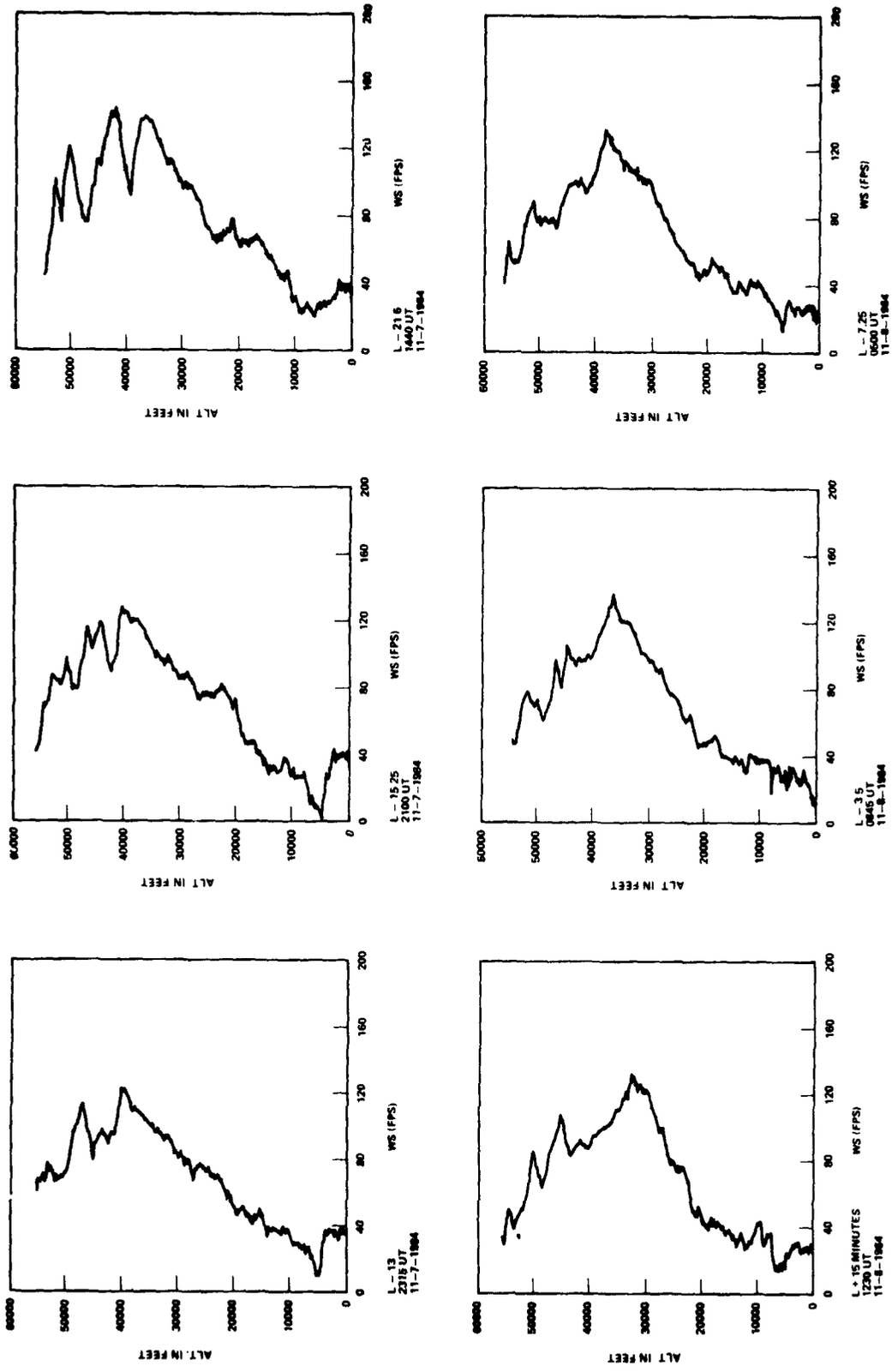


Figure 6. STS-51A prelaunch/launch Jimsphere-measured wind speeds (FPS).

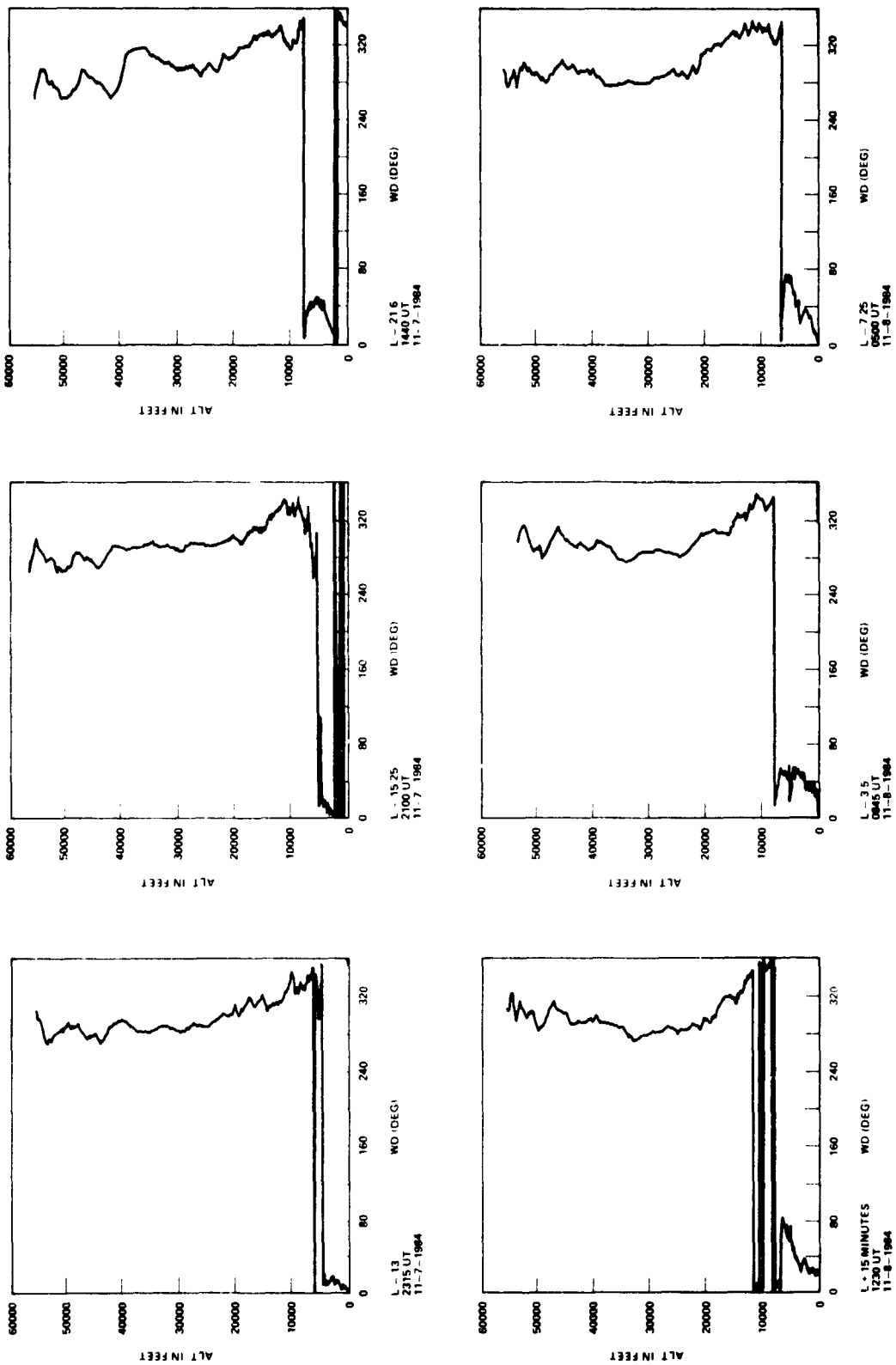


Figure 7. STS-51A prelaunch/launch Jimsphere-measured wind directions (degrees).

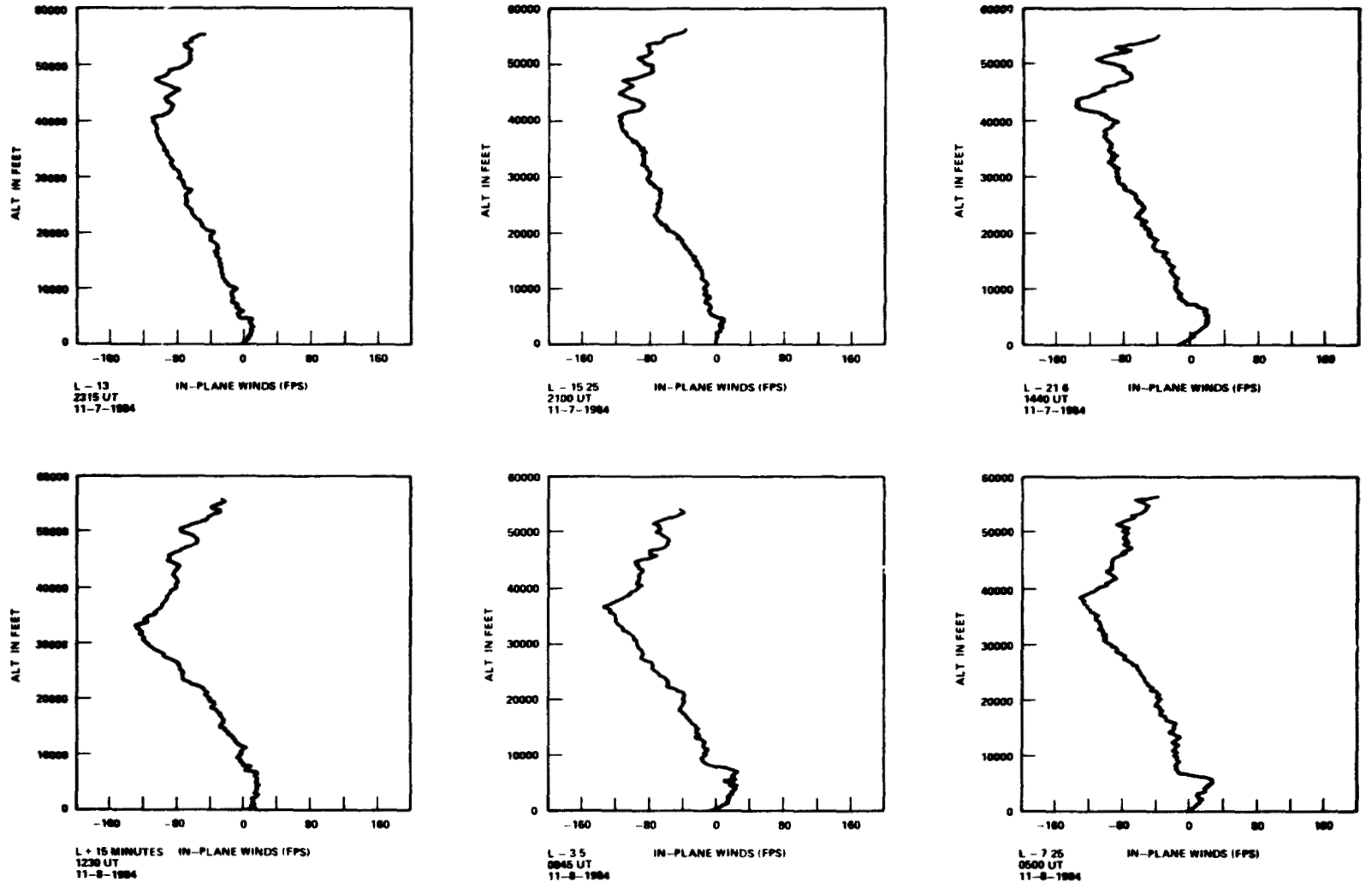


Figure 8. STS-51A prelaunch/launch Jimsphere-measured in-plane component winds (FPS). Flight azimuth = 91 degrees.

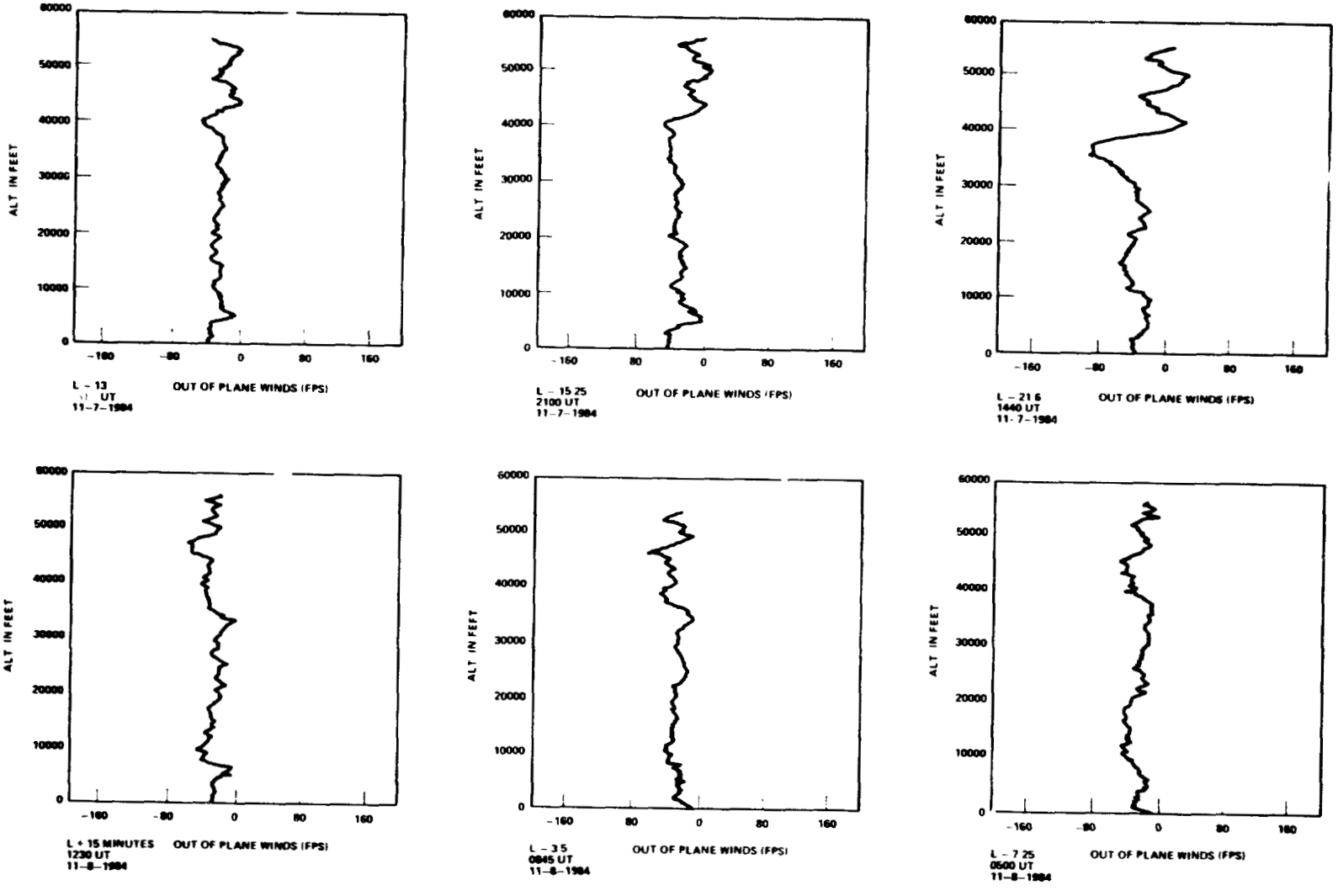


Figure 9. STS-51A prelaunch/launch Jimsphere-measured out-of-plane components winds (FPS). Flight azimuth = 91 degrees.

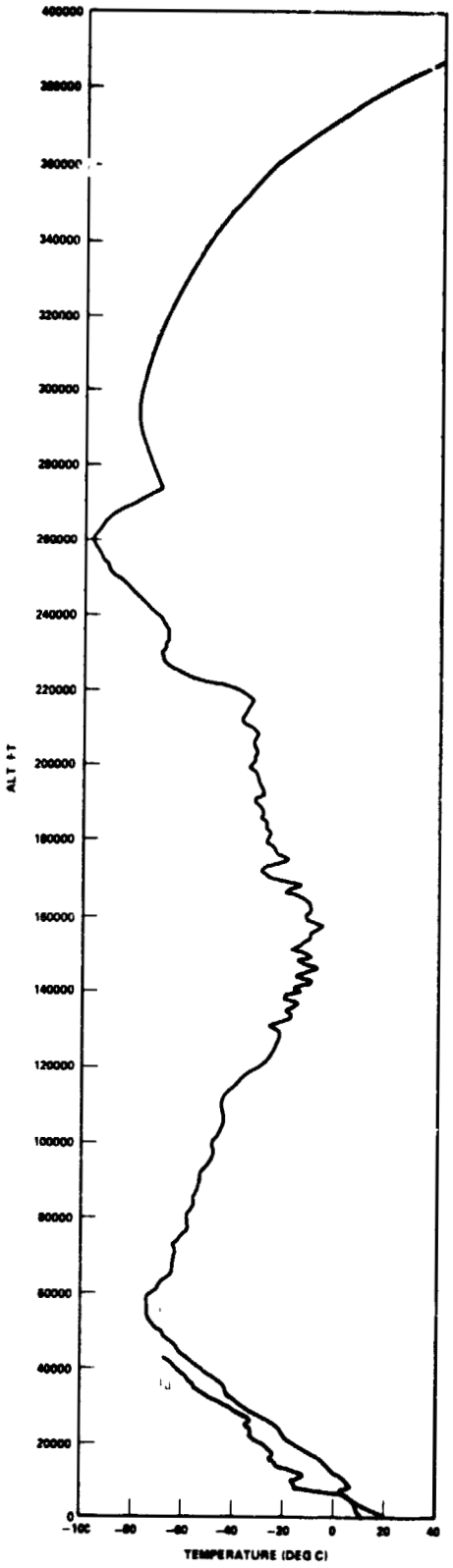


Figure 10. STS-51A temperature profiles versus altitude for launch (ascent).

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APPENDIX A

ABORTED LAUNCH WIND PROFILES

Presented in this appendix are the five sets of prelaunch wind profiles, from 1118 UT to 0941 UT on the day before and day of aborted launch (November 5 through 7, 1984), due to the computation of high vehicle wind loads aloft.

Figures A-1 and A-2 present the scalar wind speed and wind direction versus altitude for 1118 (November 5), 1122 (November 6), and 0022, 0608 and 0941 UT (November 7). Figures A-3 and A-4 give the in-plane wind components (head-tail wind), and out-of-plane wind profiles (left-right crosswind), respectively.

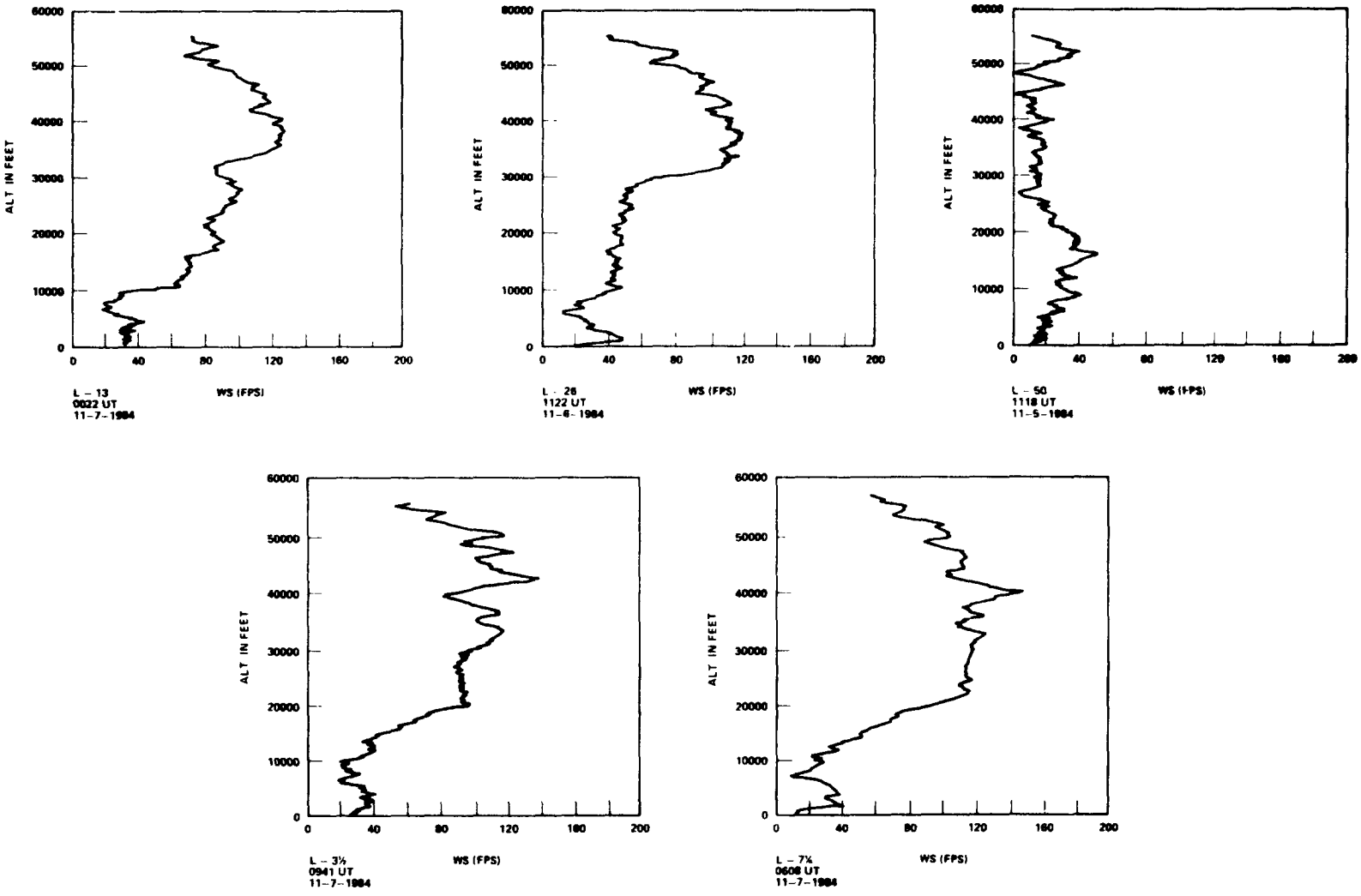

Figure A-1. Jimsphere-measured wind speeds (FPS) for day of STS-51A abort.

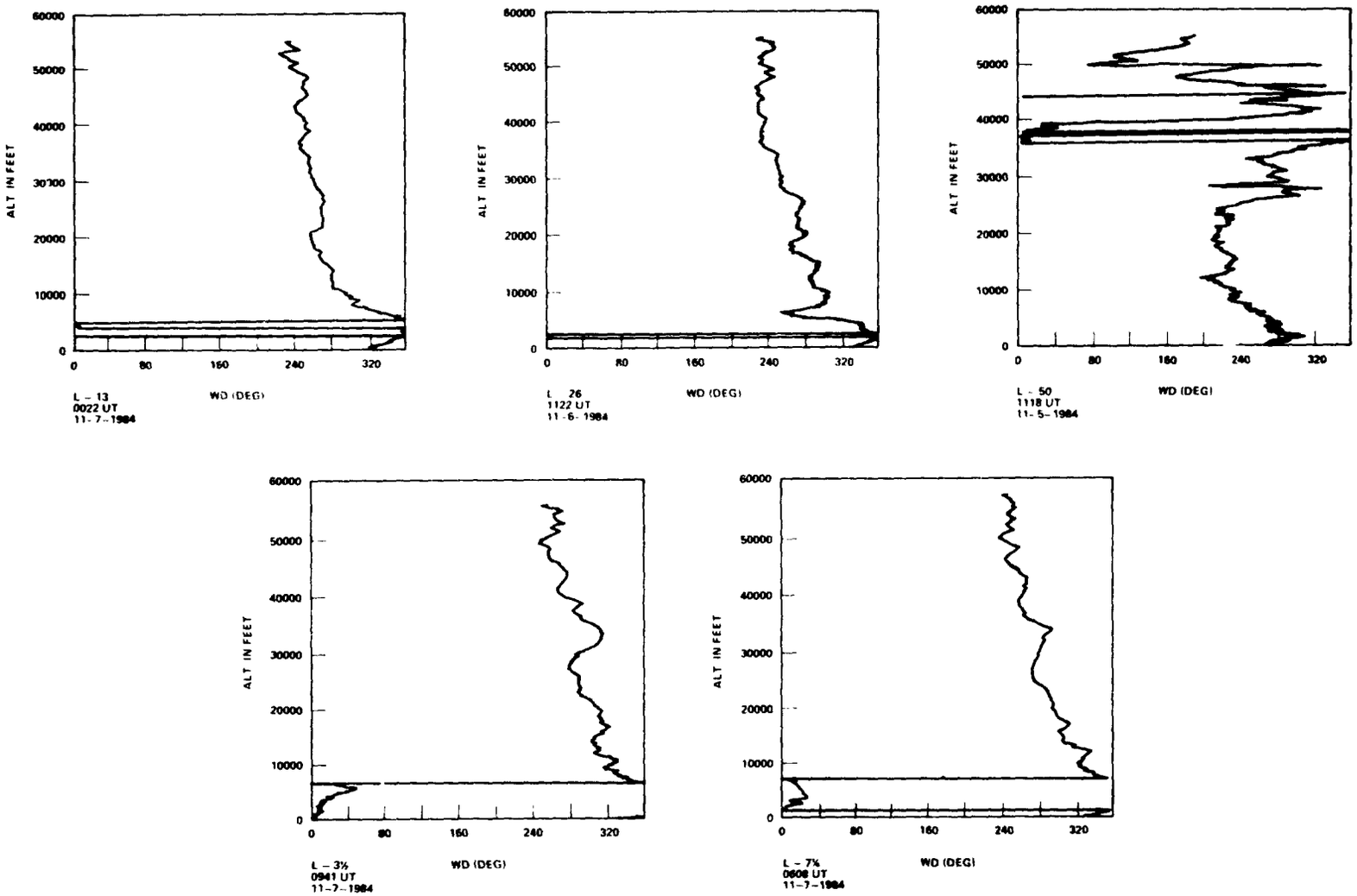

Figure A-2. Jimsphere-measured wind directions (degrees) for day of STS-51A abort.

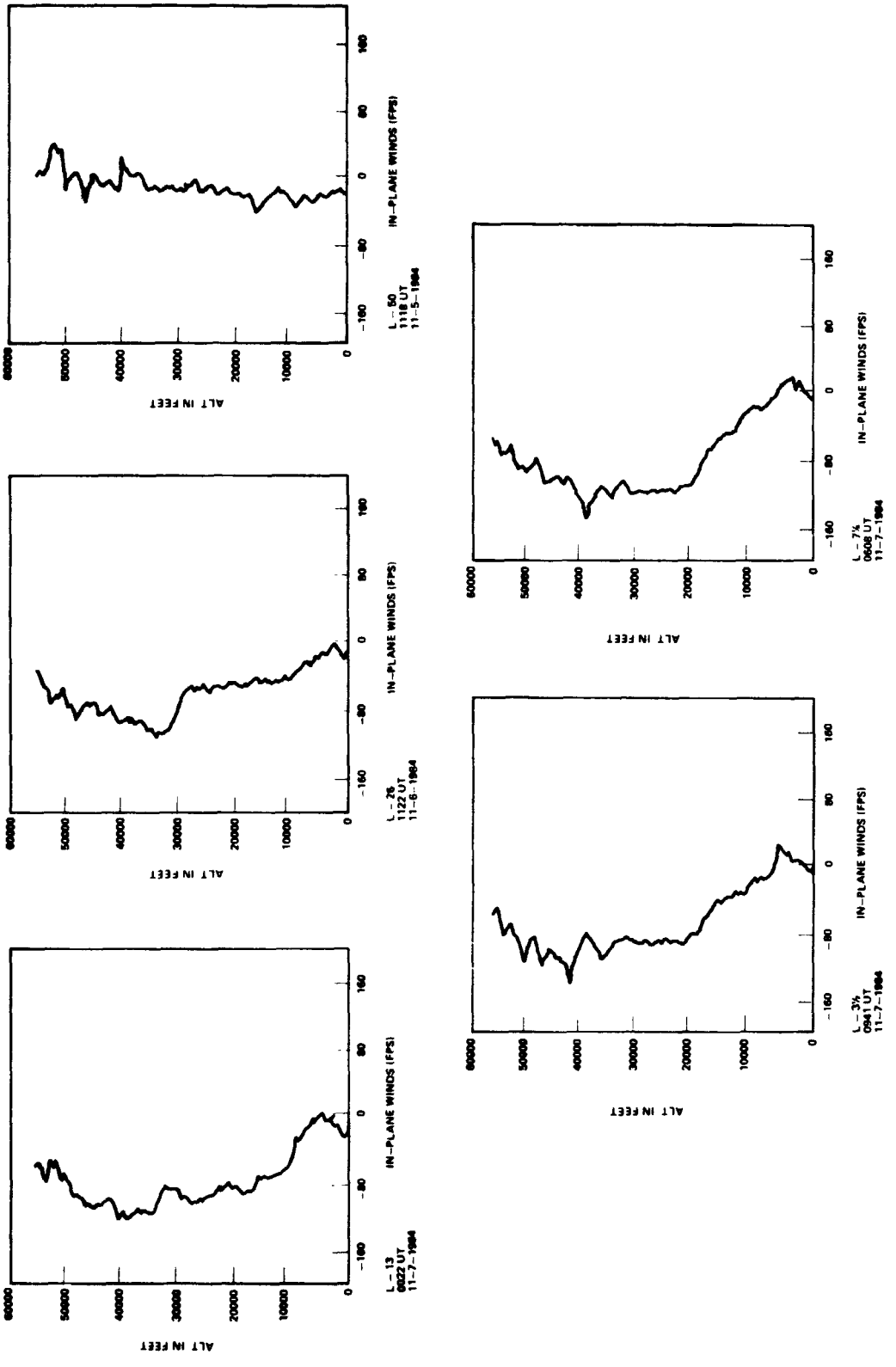

Figure A-3. Jimsphere-measured in-plane component winds (FPS) for day of STS-51A abort.

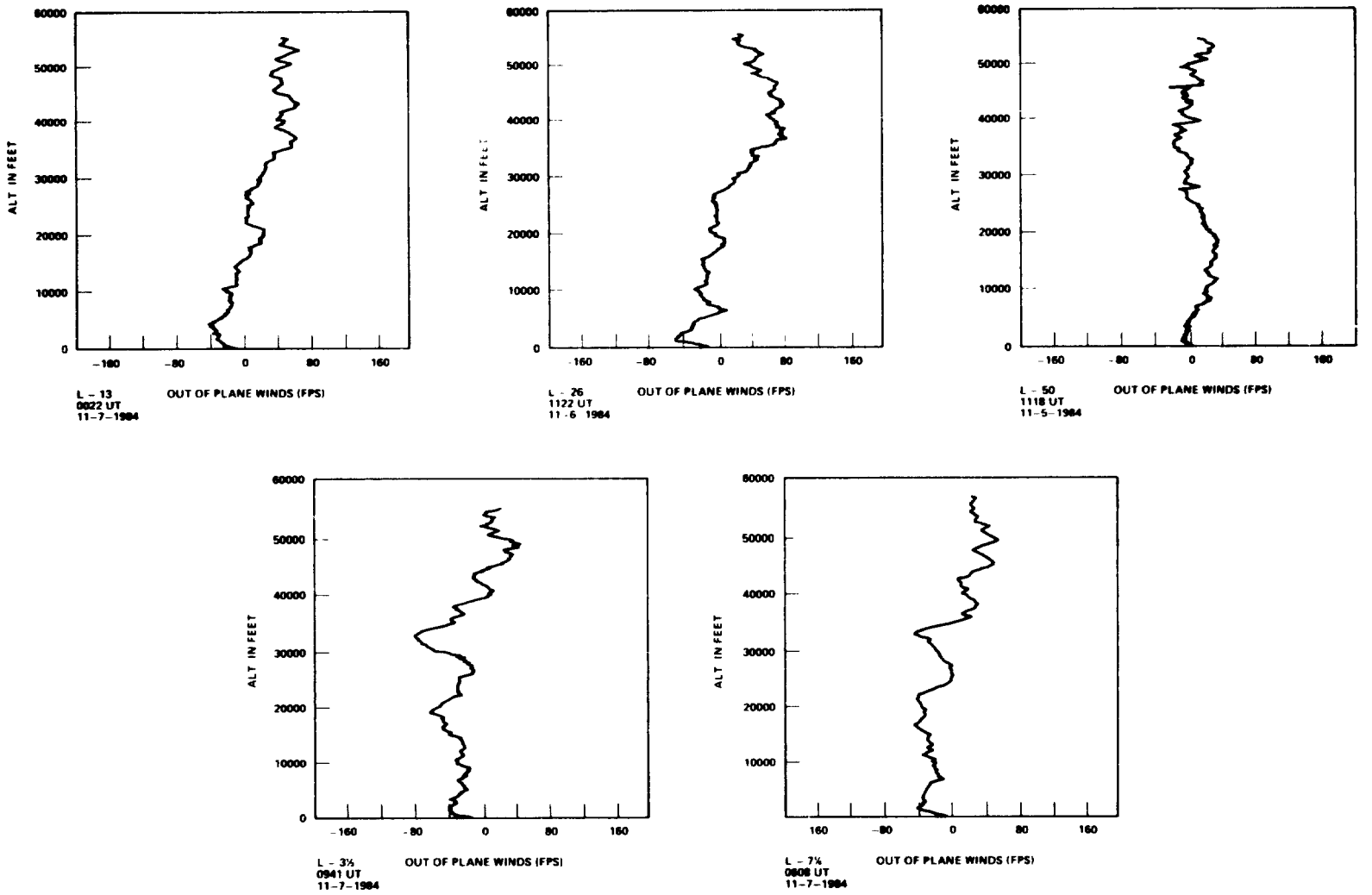

Figure A-4. Jimsphere-measured out-of-plane component winds (FPS) for day of STS-51A abort.

APPROVAL

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-51A) LAUNCH

By D. L. Johnson, G. Jasper, C. K. Hill, and G. W. Batts

The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or nuclear energy activities or programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.

W. W. VAUGHAN
Chief, Atmospheric Sciences Division

G. F. McDONOUGH
Director, Systems Dynamics Laboratory

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